# The Builder.

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## *The National Wallace Monument.*

THE proposal set on foot exactly ten years since to erect a national monument to the "high-souled knight of Ellerslie," did not meet with universal favour, even in Scotland. Among Wallace's own countrymen, there was considerable division of opinion on the subject. In England, the scheme obtained very small support. It rather afforded matter for banter and ridicule: very few on this side the border "could see it." Those who took the trouble to actively oppose the project, did so on the grounds, first, that Wallace was the deadliest enemy England ever had while Scotland was as yet a separate and independent kingdom, and that he suffered an ignominious death as such at the hands of England; secondly, England and Scotland being now united, the erection of such a memorial would only serve to perpetuate feelings and sentiments which had better be allowed to rest in the grave; and thirdly, Is it not, asked the objectors, somewhat late in the day to make a fuss about a man six centuries after his death? To all this it was replied, that Wallace was the champion, *par excellence*, of the liberties of his countrymen, and although one of the very greatest of Scotsmen, no monument to his memory existed; that though the two countries were now happily one, Scotland had an independent history, of which she had good reason to feel proud, and that if the enterprise was late, yet better late than never. The lines of a great English poet were quoted to strengthen the Scottish position:—

> "The stranger comes, his eye explores
> The wilds of your majestic shores,
> Yet vainly seeks one votive stone
> Raised to that hero all your own."

It would be useless to discuss on which side the reason and argument rested. Enough to say that Scottish patriotism, if convinced against its will, was of the same opinion still. The undertaking was proceeded with. Five years, *i.e.* from 1856 to 1861, were spent in gathering subscriptions, and in considering the architectural designs of nearly one hundred competitors. At length, on the 24th of June of the latter year, being the 547th anniversary of the battle of Bannockburn, the foundation stone was laid under auspices which seemed eminently favourable to success; for although, as we have said, not a few pertinaciously opposed the thing, the promoters came out strong and enthusiastic on the occasion. Eighty thousand persons poured into the ancient burgh of Stirling, of whom 30,000 came from Glasgow alone. The official procession was three miles in length, and such a gathering of civic dignitaries, Masonic lodges, Odd Fellows, curling clubs, and volunteer corps, was never before seen in that part of the world. The proceedings were graced by the presence of the Duke of Atholl, in his capacity of "Most Worshipful Grand Master," by several lineal descendants of the hero's family, and by "The Historian of Europe," who was the chief spokesman of the day. And, as if to give further *éclat* to the ceremony, the master gunner of Dumbarton Castle (by the kind permission of the Duke of Cambridge), appeared bearing the sword of Wallace.

> "That sword which seem'd fit for archangel to wield,
> But was light in his terrible hand."

Then there was a grand banquet, as a matter of course, whereat an unconscionable amount of Scottish whisky toddy, and of Caledonian hurrahing, was got through before the arrival of the "Wee short hour ayont the twal," when the patriots separated to the tune of "Scots wha hae wi' Wallace bled." The erection was then begun energetically, and everything looked bright and promising. All of a sudden, however, the building operations came to a standstill from want of funds. And here we must confess we never rightly understood the exact position of affairs at this point. Several very handsome sums had been subscribed. One gentleman, for instance, gave 600*l.*; nearly 1,000*l.* came from Australia; America sent half that amount; two subscribers gave each 100*l.*; two others 50*l.* each, and one subscriber 60*l.*, and altogether about 3,500*l.* were subscribed at the date of foundation. But more than this, it was stated at the banquet by the secretary of the building committee, that a gentleman, already a liberal contributor to the memorial, had guaranteed the amount still required to complete it, namely, 1,200*l.* With this guarantee, why was the building not proceeded with and finished? Perhaps Dr. Rogers, the secretary, may be able to answer this question. A sufficient reason may exist, only we do not know it, nor we dare say do any of our readers. However it is now said, in a paragraph which is going the round of the papers, that a well-known Scottish baronet, who had promised the sum of 500*l.* to the undertaking (contingent on a certain interesting event happening in his family), has fulfilled his promise, and we are informed that the promoters will now be enabled to complete the monument forthwith. We trust that it may be so, for whatever difference of opinion may exist as to the wisdom of the project in the first instance, no one desires to see an unsightly cairn of stone disfiguring a scene of surpassing beauty like the Abbey Craig, — we may say one of the finest landscapes in the kingdom. Having been so far proceeded with, an effort ought certainly to be made to finish the structure. Dr. Rogers and his friends might have taken warning from that awful failure the so-called National Monument on the Calton Hill of Edinburgh.

Of the monument itself nothing need be said here. A pictorial illustration and particular description of it will be found in the *Builder*, vol. xviii., p. 57. This is the fourth attempt by his countrymen to rear a public monument to Wallace. In 1818 a Scotsman resident in London offered to bequeath the sum of 1,000*l.* for the erection of a tower to the memory of the hero on Arthur Seat or Salisbury Craigs, Edinburgh, if such an object could be accomplished, "but no action was taken in the matter." In the following year, William Motherwell, the poet, commenced an agitation for a public monument in Glasgow. At first it seemed likely that this scheme would succeed, but it ultimately fell through. After a great deal of talk, only 150*l.* were raised towards the object. Again, Patric Park, the late ingenious sculptor, with his usual enthusiasm, formed the idea of raising a gigantic figure of the Scottish patriot to be placed somewhere about Edinburgh — probably on the Calton Hill. But after preparing a magnificent model of a colossal statue, he abandoned the idea of proceeding further from want of encouragement, and destroyed with his own mallet the model which he had so ingeniously fashioned. Whether the present attempt is to prove equally abortive remains to be seen.

## THE PRIORY OF HEXHAM.*

THERE has been so much said of late years about the Priory Church of Hexham (or Hexham Abbey Church, as it is commonly called), that it is with curiosity we perceive two more volumes have newly appeared relating to the history of this edifice. In the fulness of reading four comparatively recent publications upon the subject, we concluded, prematurely it would seem, that all that need be said about it had been said. The members of the Surtees Society, however, have thought differently, and have deputed their honorary secretary, the Rev. James Raine, to edit the two volumes now issued. At a meeting of the council of the society, held in the Castle of Durham in March, 1862, it was resolved that a volume relating to Hexham should form one of the now numerous publications of the society; and in June, 1863, at another meeting, it was agreed that the proposed work should form two volumes. It has now appeared, after the lapse of a long interval between the production of its first portly part, and its more slender successor; and we cannot but add that it proves to be a most valuable addition to the literature of the priory.

The new work is not strictly architectural or archæological, the members of the Surtees Society being antiquaries rather than archæologists. Neither is it confined to particulars relating to the church of the priory. It is more especially a collection and publication of the various documents extant concerning the history, customs, and possessions of the priory and its recluses. The public libraries of the universities of Oxford, Cambridge, and Durham; the choice collection of MSS. belonging to the Master and Fellows of Corpus Christi College, Cambridge; especially the stores of the deans and chapters of York and Durham; the registries of the Archbishop of York and of the Bishops of Durham and Carlisle, have been laid under contribution: the famous Black Book of Hexham is given at length; the Muniment Room at Castle Howard has been searched with the permission of the Earl of Carlisle; Sir W. C. Trevelyan's Blackett Papers have been placed at the disposal of the editor; and the Rev. J. A. Blackett Orde has lent him the ancient deeds relating to his ancestral estate. There are yet other papers concerning Hexham that have not been printed. Against the complacency with which Mr. Raine might regard the quantity of information he has collected there is a set-off in the vexation of not being able to trace some charters mentioned by Dodsworth, the antiquary, as being in the possession of Sir John Fenwick in 1638; and in the impossibility to give a chartulary relating to the Yorkshire property of the priory, owing to the fact that the small quarto in question has been mislaid by its owner, Mr. John Gough Nichols. The portions of the work with which we have to deal are, however, the very lengthy prefaces, no less than four in number, ingeniously divided into first and second parts to vol. i., and first and second parts to vol. ii. It is in these prefaces that the results of the author's labours are most tangible. In the matter of the recent so-called restoration, we consider the *Builder* to have been the fray-bell that called all good men and true together to prevent the loss of all ancient moveables, and the burial of all ancient sculptured stones that were used to cover pipes under the pavement in the transepts. The prodigality with which acknowledgments are dealt out to societies and individuals caused us to expect some mention of the circumstance as part of a full history of the restoration. In this we were disappointed. We were gratified to find that Mr. Raine endorses our opinion of the treatment of this ancient edifice. He says,— "It will be seen from the preceding pages that it

* "The Priory of Hexham: its Chroniclers, Endowments, and Annals." Vol. i. "The Priory of Hexham: its Title-deeds, Black Book, &c." Vol. ii. Published for the (Surtees) Society by Andrews & Co., Durham: Whittaker & Co., 13, Ave Maria-lane; T. & W. Boone, 29, New Bond-street; Bernard Quaritch, 15, Piccadilly; Mrs. Nutt, 257, Strand (foreign agent), London: Blackwood & Sons, Edinburgh.

has been cruelly dealt with." And, after remarking that large sums of money were munificently provided to preserve the characteristics of a building of which Northumberland was proud, he adds,—

"It is, however, very greatly to be regretted that modern architects are so fond of trying to displace by their own work the choicest remains of Christian antiquity. They never gain by the contrast, and the word 'restoration' is now, unhappily, only synonymous with destruction. In twenty years scarcely one old church will be left in the whole country."

We cannot take quite such a gloomy view of things as this. Indeed, we cannot but think that the fate of Hexham will act as a warning to those entrusted with the care of valuable fabrics. The portion of the preface that relates to the architectural features of the church is written by Mr. Walbran, and not by Mr. Raine. This change of pens is only to be discovered by reading steadily on, when the reader comes to an incidental mention of the fact in the text. It is with Mr. Walbran, therefore, with whom we must differ in the identification of the remains of the Priory buildings. English antiquaries, especially of the old school, are too apt to ignore the influence of the parent monasteries on the Continent upon all English founders or builders of branch establishments. They should bear in mind that the leading ecclesiastics were always in frequent communication with head-quarters. We may make ourselves sure, by inspection, that a similar disposition of the principal parts existed in most instances between the houses of a given order, whatever may have been that of their respective scales. Mr. Walbran has not realized this fact. There are evident traces of a building at Hexham adjoining the chapter-house. Because these remains have some slight ornamentation indicated, Mr. Walbran concludes that they are the ruins of a previous chapter-house to which the present splendid edifice was but the vestibule. He states that the present chapter-house was probably used when the Scots destroyed the superior edifice. The reason why a building of the class to which Hexham belongs should have been provided with a vestibule of such exquisite richness he does not explain. A reference to the plan of Clairvaulx would have shown him that the chapter-house there is in precisely the same sequence of sites as that at Hexham. Like it, too, it was composed of nine bays, and, with a still more exact correspondence, it consisted of two stories, the upper chamber having a staircase of approach in the south transept of the church. At Clairvaulx, this upper chamber was used as the grand library. Mr. Walbran thinks that some portion of that at Hexham, if not the whole, may have been used as a sacristy for the preservation of the sacred vessels and the vestments, *and many other purposes connected with the religious services of the convent.* Why not as the library? The exact structural correspondence we have pointed out seems to us sufficient to set aside the supposition that the rich and gracefully ornamented chapter-house of Hexham was once a vestibule.

Mr. Walbran believes the celebrated Frith-stool to be the cathedra of the Saxon bishops of Hexham. An illustration of this curious relic was published by the Surtees Society in 1837, which does not quite tally with its present appearance. On this matter Mr. Walbran remarks,—

"It appears that either then, or at some previous period when the drawing was made, a large concave moulding or cornice intervened between the sedile and its base, apparently of Perpendicular or Tudor character, and the base appears to have been formed of one stone. Be this as it may, I think it is questionable whether, in the original design, the lines of the ornamentation in front were not prolonged into another vertical stone below and returned at its base. I may remark here, more for the sake of future inquiry than otherwise, that on the sloping side of the elbow on the north side of the chair, I fancied I could feel some incised letters,—perhaps, after all, of no moment; which, in consequence of the dark situation, I was not able to observe by the eye."

It would be curious if the chair should be able to throw any light upon its veiled history. We cannot but feel that our author would have done well to have ascertained this point.

There is another suggestion of the probability of a new light to be thrown upon the Saxon remains here. The ancient historian of Hexham indicated the existence of more crypts than the one found in 1726. Prior Richard mentions underground oratories also. Mr. Walbran reasonably infers that we shall one day find these. The only descent now used into the crypt that has been found is down a shaft 2 ft. 7 in. wide and 18 ft. deep, by means of a ladder. When in the crypt the voices of persons in the church above can be distinctly heard. It is certainly to be regretted that some portion of the large sums spent on the recent *alterations* should not have been expended in opening out the convenient descent from the church, the steps of which are still *in situ*. This relic has been described so recently in these pages that we need scarcely make the observation that its interest would ensure numerous visitors if a less awkward mode of access were furnished. Both Saxon and Roman antiquaries are concerned as, it will be remembered, the subterranean fabric is built out of Roman remains.

Mr. Raine gives an interesting account of the Black Book of Hexham, or *Liber Niger*:—

"It derives its name," he says, "merely from the colour of the cover which it wears, like the Blue Books of the present day, which are familiar to every one. Similar appellations were common enough in old times. We have the Black and Red Books of the English Exchequer, the White Register of York, the Red Book of Durham, and the Black and Red Books of Hexham. The Black Book of Hexham is a carefully-drawn up rental of the possessions of the Priory."

It is a thin folio with black leather sides and a wooden back. The compilation of it appears to have extended over a period of some duration, for on the title-page it bears the date of the Feast of Pentecost, 1479; while among its contents are two statements that certain rents would become due for the first time at Pentecost, 1477. It is a transcript of an earlier document mentioned in it as the Old Roll, or, probably, an elaboration of it based upon fuller surveys made by the respective bailiffs than had before been given. It has never, hitherto, been printed. Mr. Raine states that it was usual to compile these surveys from the rolls of the bailiffs of each particular manor or estate, "who were probably desired to be more than ordinarily exact and minute in a stated year: the rolls would be examined as they were sent in, and the information they contained would be arranged by the terrarer." This mode of making a terrier accounts for the inequalities to be found in the descriptions, some of the bailiffs having the power of showing more photographically than others the property in their care. The priors possessed landed estates in the counties of York, Durham, Northumberland, and Cumberland. Mr. Raine computes their Northumbrian acres at twenty thousand. Besides these they had a herring fishery near Allerdale, and two salmon fisheries at Newburn. These large proprietors were generous and lenient landlords. Mr. Raine, who has examined all the evidence that has survived the lapse of centuries, handled their terriers, and seen their antiquated accounts in such forms as are left, says they divided their lands at each place among three sets of tenants, farmers, husbandmen, and cottagers, or else let it to one tenant, who subsequently sub-let it in a similar way. In these days of walls, fences, roads, &c., it appears wonderful that the bailiffs were able to indicate their possessions without such aid. Their plan appears to have been to draw imaginary lines between large objects, such as a tree or a standing stone, to serve as boundaries. Sometimes they were bequeathed a piece or share of unenclosed land in the middle of a moor, or piece of woodland, which it must have been difficult indeed to describe, but which the canons seem to have retained notwithstanding the inconvenience of doing so from a dislike to alienate anything left to the Church. The disputes which such entanglement entailed were referred to the verdict of a jury. Wayside crosses are sometimes mentioned in the black book as boundaries. Celtic standing-stones and the great Roman wall are also mentioned as land-marks. There are a few notices of unusual tenures. One of these informs us that the wife of the Lord of Dissington was bound to present at the high altar of Hexham on St. Andrew's Day two corporax cloths, an offering which it was understood would free the prior's tenants at Eastwick of moulter charge. Her husband was to rise and offer his seat to the prior whenever they met. Mr. Raine suggests that this enforced deference was to serve as an acknowledgment of the offence of Edgar, son of Earl Cospatric, and Robert and Uctred Fitz Meldred, who slew three of the prior's servants in an assault that took place at Dissington in the twelfth century.

Mr. W. B. Beaumont is in possession of a very interesting charter relating to the possessions of the canons. The Scots, in the reign of Edward I., destroyed the muniments of the priory. To secure their lands to the canons, the king issued a commission to inquire into their exact extent, and then confirmed them in their possession by the charter in question.

Prior Richard's history of the Church of Hexham, like the same prior's account of King Stephen and the Battle of the Standard, has been printed before; but Mr. Raine's careful and copious notes render this imprint very valuable. The Lives of the Saints of Hexham, by the Abbot of Rievaux, are refreshed with the same treatment. We can but thus slightly indicate that the latest work on Hexham is of more than local interest. The engravings and woodcuts of the Saxon remains are valuable to South-Humbrians, as well as to North-country antiquaries. The editor gives an interior view of the priory church; but eccentrically withholds any delineation of the exterior. There is a view of the town and country, in which St. Andrew's is minutely shown, overtopping the trees and houses; but wherefore no architectural illustration of this most picturesque fane?

## MANCHESTER CONGRESS OF SOCIAL SCIENCE ASSOCIATION.

A special service in the cathedral on Wednesday afternoon, opened the public proceedings of the Congress, and in the evening the Earl of Shaftesbury, as president, delivered the inaugural address, in the Free Trade Hall. Of the success of the half-time system, in education, the president spoke decisively:—

"The alternation of work and study, in due succession and relief, the half-time system, as it has been called, is alike healthy and fruitful. The mind is not depressed by the labour, but the labour is invigorated by the refreshment of the mind. Do we not all feel the principle of it in ourselves? Its practical and most blessed effects we see in all the mercantile occupations governed by the provisions of the Factory Acts. We see it in numberless Industrial Schools in London and elsewhere. If you doubt the assertion, study the reports of Messrs. Baker and Redgrave and their efficient officers, the sub-inspectors; study it in the reports of Messrs. Chadwick and Tufnell, in their accounts of the Metropolitan Scholastic Establishments.

A short time back the excellence of the system came before my eyes in a very prominent way. I visited the Potteries in company with Mr. Inspector Baker, to whom we owe so much, so very much, of this successful issue. I need not describe to you the bodily and mental degradation, in former days, of that neglected district, the state of the places of work, the dust, the insupportable heat, the prolongation of toil through the day and through the night, the utter ignorance, the gross immorality, with all the evils that attend on a defiance of the material and spiritual laws of nature. They are all set forth at large in that true bill of indictment against the English nation, the five reports of the Children's Employment Commissioners. But how is it now? Though the test has, as yet, been only partially applied, the scene is changed. Two thousand children are at school on the half-time system; and two thousand children are thus exhibiting the results of mercy, consideration, and love. The evidence of the teachers who knew them before, and who know them now, is wonderful and heart-stirring.

The half-timers are equal, nay, oftentimes superior, to the whole-timers,—that is to say, those who study and work surpass those who study and do not work at all."

Farther on the speaker remarked,—

"I must dwell for a moment on the abomination of the Brickfields. Let the hardest heart that can be found in England visit those spots, and if he be not moved, he must at least be ashamed of his sex and of his country. There the female seems to be brought to the lowest point of servile ignorance and degradation. Hundreds of little girls, from eight to eleven years of age, half-naked, and so besmeared with dirt as to be barely distinguishable from the soil they stand on, are put to work in these abodes of oppression. Bearing prodigious burdens of clay on their heads and in their arms, they totter to and fro during many hours of toil. When I spoke to them they either remained aghast with astonishment, or ran away screaming, as though some evil spirit had appeared to them. I could not restrain my indignation, nor can I now, at this wicked scorn of female rights—this wicked waste of female excellence and virtue. Mothers and wives they can never be in the high and holy

sense of those words; and yet, were they trained to decency and truth, might there not be found some to equal the priceless heroism of Lady Baker, or the Christian intellect of Mrs. Stowe?"

On the health question Lord Shaftesbury said,—

"Essential, and, indeed, indispensable as is the section on public health in any meeting of our congress, it need not be dwelt upon in an opening address. The subject has excited a deep and general interest. Almost all the causes of mischief have been dived into, and brought to the surface; and remedies of various kinds have been suggested for their cure. The Legislature, too, by the Act of last session, has declared that a wider activity must be exercised by the Government, and larger powers be confided to it. But there are yet two points on which the executive is nearly impotent, and those of the greatest consequence to the labouring poor,—the wretched supply of water, and, in the widest sense that can be given to the term, the adulteration of food. Let us hope, and let us work, in this very congress, that another year may not elapse without an effectual abatement of these monstrous inflictions.

But the master-evil which nullifies every effort for the benefit of the working-people,—which leaves us no rest,—and on which let us take good care that the public also has no rest,—the evil that embraces and intensifies all the others, the hot-bed of pauperism, immorality, disease, and drunkenness,—drunkenness alternately the cause and consequence of disease,—the evil that is negative in preventing every improvement, and positive in maturing every mischief,—that lies at the root of nineteen-twentieths of the corruptions that beset our social state, and forms the crowning abomination of the whole, is the domiciliary condition of many thousands of our people. But, we must look not only to the pestilential character of the actual dwellings, but to the unventilated, fever-breeding localities in which they stand,—the dark, damp, and narrow alleys never visited by a ray of the sun, or a breath of fresh air. To describe these things is impossible. They must be seen, smelt, tasted, in person. Dirt and disrepair, such as ordinary folks can form no notion of; darkness that may be felt; odours that may be handled; faintness that can hardly be resisted, hold despotic rule in these dens of despair. There are hundreds where there should be tens; and thousands where there should be hundreds. The overcrowding is frightful,—it disgusts every physical and moral sense; and the more so when we see it as a growing, not a declining, evil. The numberless displacements, past, present, and to come, fill the poor people, and us too, with terrors and perplexity. And, as though this were not enough, the countless hosts in London ejected from their homes, and endeavouring to find shelter in dwellings already occupied, and abounding with life far beyond every limit of decency, health, and comfort, are encountered by some 40,000 immigrants annually, who are seeking the same accommodation, and contribute, along with other causes, to heap family upon family in these bursting tenements, to lower the rate of wage, and yet raise the rate of rent, for the great mass of the unskilled labourers.

Is there no remedy for this? None that I can see, except a new fire of London to sweep away all those filthy regions that must be destroyed to be improved; and then a vast and liberal contribution from all sorts and sizes of men to erect the City on a basis of health and humanity. Four-and-twenty years of experience in the matter have led me to no practical conclusions on a large scale. We have built model lodging-houses; and, so far as they go, they are a blessing to the people. But "what are they among so many?" They yield every return that a mere philanthropist can desire, but, financially, nothing that could tempt the large capitalists, who seek a remunerative investment for their money. The price, too, of land is rising mightily; and the great increase of wages among carpenters, masons, and bricklayers is a very heavy addition to the cost of building, and, by consequence, to the amount of the rents. Houses are springing up around the cities, it is true, but they are altogether for workmen of large weekly receipts. Suburban villages are proposed with penny-trains, but the objections made to them are endless,—principally by the women, who assign to me very sound and business-like reasons for refusing to quit their ordinary abodes; and, indeed, were they to do so, the public weal would be little served thereby, for the filthy tenements (unless a wholesome system prevailed to pull down in proportion as you built up) would instantly be seized by a herd of occupants, and all the mischiefs be perpetuated, and probably increased. It is necessary, moreover, that many classes of skilled workmen should have their dwellings within hourly reach of their principal and of each other. To these the suburban village and the penny-train are of small use; nor, in truth, to any but those who have fixed hours, fixed places of work, and good and certain wages. To the labourer who lives from hand to mouth, hunting around for a job, hanging about the docks, the yards, the shops, the courts, always uncertain of the amount of his gains, and sometimes uncertain of any receipt at all, "rising early and late taking rest," the railways and the residences are utterly worthless; and yet these classes are the vast majority of the ill-housed population. For these, our model-buildings have done nothing, and can do nothing; no one of the schemes hitherto propounded, no one of the Bills submitted to Parliament, holds out even the shadow of a promise. Suppose it be ordained that tenements shall be built: it follows, of course, that they must be constructed with everything that health and decency require. But who of this class of the people will be able to meet even the lowest rate of the new weekly payments for family houses? And, if constructed on a plan of single rooms, the utmost that these casual labourers are able to afford, we shall perpetuate, by law, a system of life, subversive of every moral and physical obligation."

On Thursday morning the various departments met in the Assize Courts and proceeded with the discussion of their special questions, various papers in each department being first read.

## A BIT, YET EXTANT, OF FEUDAL OLD ENGLAND.

Amid the startling events of this memorable year, when the faculty of wonder becomes weakened by over exertion, when the same month witnesses the intellectual union of the continents of the old and of the new world, and dates the final dissolution of the shadow of the Holy Roman Empire; when new and mighty forces are coming into collision or combination, big with results that we can no more foretell than we can anticipate the form to be assumed by some untried chemical compound, it is not unnatural to long for some point of rest, some undisturbed station of observation, from which to judge of the tendency and the speed of the motion which everywhere surrounds us while for a season removed from its vortex.

If, for instance, we could steal a few hours from the unfevered leisure of our ancestors, if we could regard the political march, or rather rush, of events with the gravity of the counsellors of Elizabeth, if we could study the daily triumphs of the chemist and the mechanic with the meditative patience of the alchemists, we should not fail to deduce lessons of wisdom that we altogether lose in our anxiety for the latest telegram, or our speculation on the newest patent. If we could look from England of the sixteenth or seventeenth century on the England of the day, should we not look with nobler sentiments than that of mere wonder, or of unmixed self-gratulation.

To render such a survey for a moment possible, even in imagination, we must first be able to realize something of the life of the feudal times. In some parts of Germany, indeed, feudality, if not extant, has not been many weeks dead; and, no doubt, some of the ancient grafs, who are being so mercilessly unshelled by needle guns and field telegraphs, considered that their life was that of the great lord of the time of the Crusades. But Germany is not, for the moment, the most inviting region for a summer ramble, or for the scene of a philosophic meditation.

And, again, German feudalism is wanting in one great feature, essential to the vigour and the symmetry of the system as it flourished among the Norman chevaliers in France, England, Italy; it has lost the force of the law of primogeniture, the effect of which was the union of society in one connected hierarchy, and in the absence of which the difference between the noble and his peasants degenerates into a schism of caste or of class. When you hear of German villages in which all the inhabitants are noble, down to the ostler who condescends to hold your horse, you may think of the wild cateran painted by the author of Waverley as insisting on being considered as "shentlemans," but you trace no affinity to the Rohans or the Montmorencies. The towers of Warwick and of Windsor are not reared *ex quovis ligno*.

Turning to the other extremity of the map of Europe, you may look at Southern Italy, where the feudal laws were in operation when the present century was in its teens, and where, only six years ago, it was thought necessary, on the creation of any new title, to specify in the royal decree that authorized its assumption, that it was not to convey any right of feudal supremacy. And yet there you find but faint and vanishing reflexions of the Middle Ages. There are, indeed, the great mendicant orders; but their days are numbered, and the evil practice introduced by the Dukes of Savoy, of submitting ecclesiastical offenders to the sharp and undistinguishing process of the civil law has ruffled the plumage and lowered the crests of almost every spiritual person, secular or regular. The peasantry, in many places, are as rude and as ignorant as you can desire to see; but the physical geography of the country, by the large proportion of seaboard which it affords, tends to the percolation of this dense agricultural mass by seafaring and commercial men, whose views, strongly opposed as they are to those of the priest-led peasantry, are anything rather than Mediæval. Brigandage, indeed, is an institution; but it is a brigandage of a savage and popular kind, which would at once have been put down by the iron hand of the old feudal nobles, who would allow none but themselves to shear their own sheep. Thus of the lingering characteristics of the feudal times we can at present trace but those which are most obnoxious, and which, removed from the other influences by which they were formerly tempered, can give no correct idea of a former state of social life. One exception remains, and that a graceful and instructive one. The old territorial rights are abolished; the large hereditary properties are for the most part divided *ad infinitum*. Elbowed from their palaces by the speculators of the day, by Jew barons and shoddy millionaires, the owners of the historic names remember, and the peasantry remember, so much of the past as to be able to mingle on terms of patriarchal and affectionate familiarity. The peasant will take no liberty with the signiori; he will never overstep the acknowledged line of demarcation, and therefore the noble can enter the cottage as a guest; can treat his servants as if they were younger kinsfolk; and from the permanent effect of the marked distinction of rank can enjoy a simple dignity in the intercourse with those below him, of which those who have never been served by any but hirelings can form little adequate conception.

It is, then, neither to Germany nor to Italy that we now call the attention of our readers who would take a peep at feudal times. It is nearer home. Within a twenty mile radius of St. Paul's, on the borders of two inland counties, lies the scene to which we refer, shaded by timber that is the growth of centuries, and stretches in coppice and avenue and tufted wood, around one central patriarchal oak of at least five centuries growth. The name of Isel Hampstead, which appears on the ecclesiastical citations of the rector, is not to be found on the ordnance map, nor even in the ordinary county guide-books. Like not a few "*terres nobles*" of feudal times, such as Bourbon l'Archambaud, and Guerchi-Reignier, in France, and Kingston-Russell, in Dorsetshire, the estate annexed to its ancient name that of the family in whose possession it remained until, falling to the spindle, it came to swell the wealth of one of those great Norman houses that rose to a new and more towering importance when King Henry VIII. paid to the religious houses of his day, that same sore visitation that Victor Emanuel is now applying to the Italian monasteries. But unlike most other places which assumed, rather than gave, a patronymic, the name by which the village in question is recorded in "Domesday Book," has almost passed from the memory of man, and that of the old Norman house, extinct in Tudor times, alone is currently known as its designation.

From forty to fifty years since, this village might have been selected as a type of all that was most rural and all that was most neglected, in the country. The noble mansion, with its peculiar and unrivalled stacks of moulded and twisted chimneys, which had once formed three sides of a quadrangle, was half pulled down, and the remainder in part let out as cotters' tenements. The ivy that shrouded it seemed almost necessary to prop the old gables. The

church, with its family chapel, of Tudor time, lay in a neglected churchyard, hardly separated from the common, which was at once the playground of the village boys and the grazing-field of the parson's mare. The houses, cottages all, were old and ruinous; picturesque, indeed, exceedingly, but neither clean nor weather-tight. Blue-eyed children, with faces black with cherry or blackberry juice, stared rudely at the rare face of a stranger, or disappeared from his presence with whoop and with howl. Poaching and pillow-lace weaving were the chief industries of the place. The great lord to whom it belonged, had found his revenues, princely though they were, too strait for his requirements, or rather, it was said, for those of her grace. The axe rang constantly in the woods, and the ancestral beech were exchanged for counters on the card-table. The parson,—for the scene would be incomplete without reference to the most important figure on the canvas,—chiefly concerned himself in the preservation of game and of fish. He had a long and active feud with the villagers in consequence of his having inclosed the most beautiful portion of the common, and annexed it to the glebe. In order to protect the young partridges, he had offered a premium of a shilling for every cat's tail that was brought him, till one astute villager, who loved his cat and loved his shilling too, amputated this portion of the living animal, obtained the parson's shilling, and long preserved the active witness of his reverence having been outwitted. Indeed, the rector was said never to be known to enter the cottage of one of his poorer parishioners unless the culprit were ill advised enough to go twice to church on a Sunday, in which case he was pretty sure of a pastoral visit, with the inquiry as to why he aped his betters, and a strong hint not to do so again.

It is not possible to find a spot where a strong-minded improver, well up in his political economy and familiar with the resources of the share-market, could have wrought so great a transformation. The distance from London is such as to render any scheme, however bold, certain to answer if vigorously pushed. First, the woods were actually crying out to be converted into ready money. Far cheaper is it to buy Canadian or Norwegian timber than to grow your own. How much red deal or white pine is better for building purposes than beech! The axe, then, could reap a goodly harvest, and render the future steps of the speculation as easy as you like. Then a part,—say a very small part,—of the land thus summarily cleared would be enough to tempt the railway company, of which one of the feelers or single-line branches already protrudes within 4 miles of the village, to extend a branch, which the character of the country would render very inexpensive. The old house and the old chapel, at no very great expense, could be converted into attractive lions; and then, range after range of neat villas, with more or less of garden sloping down to the stream, with a few trees left to shade them, a good railway boarding-house, a judicious sale of tickets for the fishing of the trout stream, an enlarged church, with all that is most attractive in its services, and a properly-educated official, as at Paris or Naples, or places nearer home, to sell you pew-tickets at the door while service is going on, so as to save you trouble,—these are but a few of the steps which must suggest themselves to every competent mind as proper to be taken, with the absolute certitude of converting a neglected village into an attractive suburb, that would be yet more valuable to its fortunate possessor than a mine of gold.

Unfortunately for the lovers of speculation, it is not thus that the present rector, the near relative of the noble proprietor, has seen fit to deal with his cure. He has, indeed, rebuilt the village; but it is a restoration, not a desecration, of some of the most picturesque features of English cottage architecture that are anywhere extant. So perfectly does that which is new harmonise with that which is restored, that it is only by the stone slab which bears the date, together with the coronetted cypher of the builder, that the stranger can tell which is which. Every detail of the old timbered cottages, every peak of their porches, every corbel and mullion of the bay windows of great house or of cot, has been lovingly and carefully preserved. Bricks rubbed and pointed, stone quoins renewed, ivy trained and trimmed, but not torn down, the churchyard carefully fenced by a wall composed of alternate squares of Bath stone and flint rubble, the church restored in perfect taste,—such are the reforms of the present incumbent. It is true that the encroachment on the common, commenced by his predecessor, has been rather increased than atoned for in these changes; but if the picturesque cottage which serves as a lodge to the rectory-grounds needs apology because it stands on that part of the old common where a peripatetic butcher's stall upon wheels was wont to rest in the days of the old rector, who would not allow a house to be let for the purpose of a butcher's business in the village, that apology is to be found in the presence of a still larger occupant of a part of the once privileged green—a school for forty boys and forty girls, which not only has absorbed the urchins that used of old to idle on the site, but has attracted scholars from the neighbouring parts of the county by its well-known excellence.

The parish church, dedicated to St. Michael, is a structure of flint rubble, the natural masonry of the chalk district, with Bath-stone quoins and voussoirs. The interior is rendered with a light brown stucco, that sets off the stonework, and gives a warm habitable effect to the building. It consists of a chancel, rather larger than usual in a village church, a nave, and south aisle, divided from the nave by four bays of columns and flat pointed arches, and a belfry tower, pierced with a large arch at the east end, so that it opens into the nave, and the ringers form a portion of the congregation. Parallel with the chancel, and extending down about a fourth of the nave, is the family chapel, which opens into the church by two carved and pierced screens, the one which opens on the nave serving as the entrance-gate. The windows are all of stained and figured glass of modern date, with verses written in church text, bend wise across those of the chancel. The fittings are of oak, simple and excellent, the candlesticks being remarkable for their elegant simplicity, consisting of oak rods, some 5 ft. high, each fastened by a bronze ring and socket to the upright of a seat, and supporting a group of three sockets for lights, of brass and bronze, with a brass fleuron at the apex. The candlesticks in the choir are of twisted bronze. The pulpit is old, of carved oak, but brought down from the pedestal common in country churches, so as to harmonise with the reading-desk and pews. The font is of old carved stone. No vestry is attached to the church, but the deficiency is supplied by a pierced oak screen, which shuts off a narrow strip from the east end of the south aisle, thus economising the only portion of the church invisible from the pulpit. Several ancient brasses, in good preservation, removed from their former position on the pavement, are built into the west wall of the nave and aisle, and in one fragment of ancient glass, let into the eastern window of the chancel, a flaxen-haired and purple-robed ancestress of the house kneels in perpetual prayer, *orate pro animâ ejus*.

The mausoleum or family chapel contains several interesting monuments, with escutcheons, banners, helmets, and iron coronets of the knights, barons, earls, marquesses, and dukes, whose arms are severally blazoned in the eastern window. A very fine alabaster monument, evidently of Italian workmanship, record the dignified and determined features of the first great noble of the house, high in the confidence of successive sovereigns, who was laid to rest in the second year of Queen Mary. A succeeding lord lies near, not only sculptured but painted as in life, as are the numerous escutcheons, and the grim supporters and crests that watch his marble slumbers. The first duke and duchess, with medallions of their nine children—of whom one, whose name is familiar as a household word to every reader of English history, was a well-remembered and regretted political martyr—form the subjects of a large group at the west end of the chapel, and the four windows on the north severally received the date and name of the cadet of the French house who first held territory in England by tenure of grand sergeanty under the Conqueror, of the first baron, the first earl, and the first duke, who, rapidly succeeding one another after an unrecorded interval of five centuries, were his lineal male representatives. The continuance of the same estate in the same male line and name from the time of the Norman invasion is most rare among our own, and even among the far more numerous French nobility. The roof of both church and chancel is of wrought oak, almost black with age, but clean and as free from cobwebs as the Irish oak roof of St. David's Cathedral. The principals are trussed as queen-posts, supported by large cantilevers, each containing a wrought arch, which is of the depressed Tudor form that characterises the windows of the building and the arches of the screen in the nave, but takes a semicircular form in the chancel and chapel, giving greater height to these roofs. The white plastering filled in between the dark lines of the rafters characteristically adorns the roof.

The old house is of brick, a two-storied structure, with corbelled bay windows, steep roofs and stepped gables. The battlements of a square tower, that peep indistinctly from among the gables and chimney stacks, seem to give traces of a fortalice older than the present Tudor structure. That portion of the house which formed part of the centre of the open quadrangle is buried in masses of ivy. But the great peculiarity of the great house is to be found in the chimney stacks. The chimney corner, common in wood-clothed and wood-burning counties, has here attained its apogee. Six immense stacks adorn the existing south wing, each of them resting on a projection of some 6 ft. by 10 or 12 ft., built as an annex against the blank wall that the south face otherwise presents, with independent stepped gables of its own, from the summit of each of which towers far above the roof of the house itself and the surrounding trees, a stack of two, three, or four lofty chimneys of cut and moulded bricks, an architectural feature which is imitated, at moderate distance, by most of the old timbered cottages of the village.

In architecture, Mediæval, and yet fresh and clean, in wealth of wood and avenue, in the verdure of that crisp, short, fine-leaved grass peculiar to the old parks and lawns of England, in rural and picturesque repose, we have lighted on a spot such as might have existed before a Stuart mounted the English throne. But the moral aspect of the village no less recalls the best features of the feudal times. There is no middle class—no pushing commerce, no self-asserting speculation. The few gentry of the neighbourhood, retired professional men and the like, harmonise as quietly with the tone of the place as if they had been the bettermost retainers of the great family. Everywhere you see the peasantry brought into close relation and frequent intercourse with the seigneur,—not, indeed, with the noble proprietor, who has no residence on the spot, but with his near relative, the rector, who thus both in his pastoral and his family relations, may be regarded as the ruler of the village. To his exertions may be traced the architectural and the moral restoration of the spot. Through his constant attendance on the school, the building for which is at this moment being enlarged, may be traced an effect on the scholars far more marked than that of the ordinary tuition of schools of far higher pretensions. The amount of knowledge imparted may be due to the capacity of a master, but the tone and manners of the pupils, the elimination of the strong provincial accent that was wont to characterize the place, the sweet modulation in which verse or catch in childrens' tone replaces the rude shout of the beer-house, or the oath of the poacher,—such effects as these are alone possible when, as in the present instance, a man of high rank, of gentle manners, and of college learning, is content to devote himself to the faithful discharge of the humblest and most pressing duties of the village pastor.

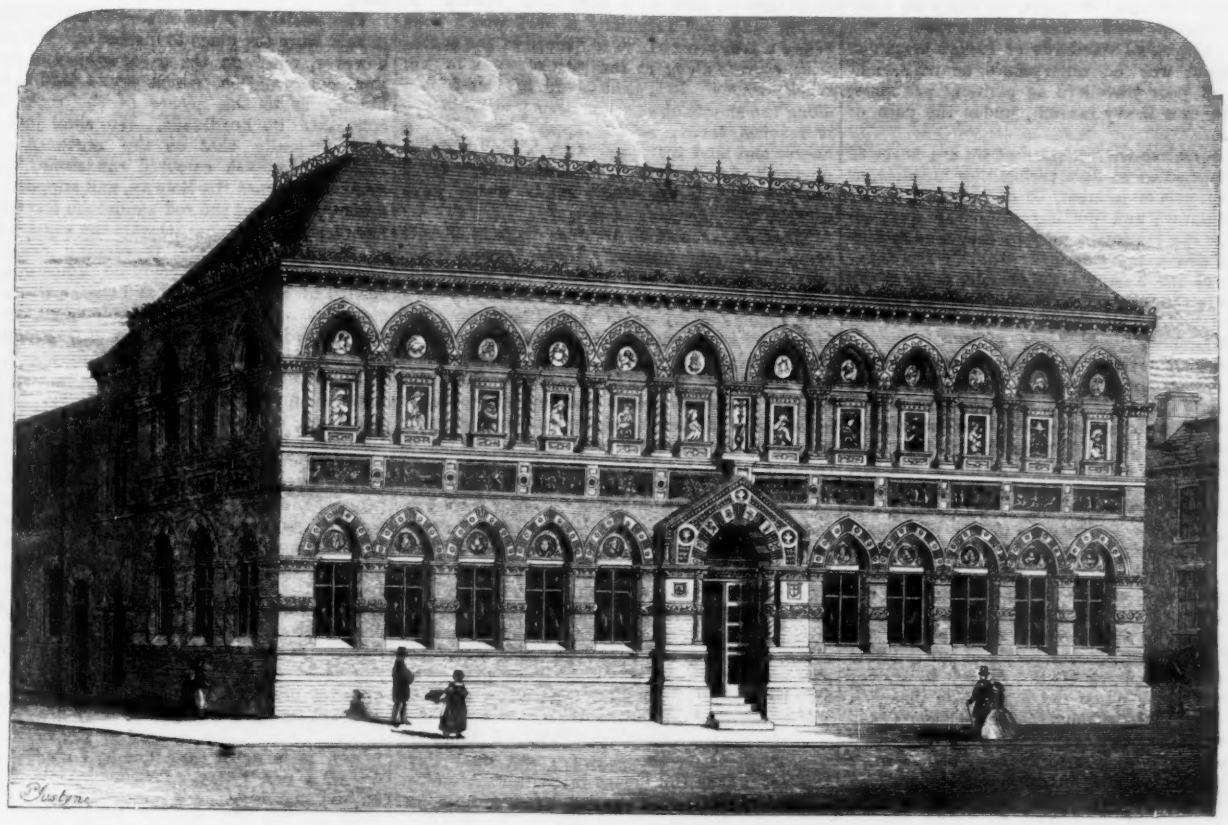
## THE LIFE OF WEDGWOOD.*

A handsome and portly volume of 643 pages brings to a close Miss Meteyard's labours on the life and works of Wedgwood. We content ourselves at the present moment with announcing its publication, and giving a few quotations from it, touching interesting topics: before long we shall refer to it more closely.

As to Wedgwood vases and their varieties, Miss Meteyard says:—

"The ornamental vases produced at Burslem and Etruria may be divided into seven chief sections. The cream-colour and its variations, as those with blue necks and ornaments variously gilt; the black basaltes; the terra-cotta pebble and marbled bodies; the bronze antique; the encaustic Etruscan and Grecian; and the jasper. There are variations even of these; as the cane colour, ivory, and others, though they respectively belong to one of the sections indicated. The cream-colour vases may date from about 1763, when Mr. Wedgwood had

* The "Life of Josiah Wedgwood, from his private Correspondence and Family Papers." By Eliza Meteyard, with numerous illustrations. Vol. II. London, Hurst & Blackett, Great Marlborough-street. 1866.



THE WEDGWOOD MEMORIAL INSTITUTE, BURSLEM, STAFFORDSHIRE.

brought this body to a great degree of perfection; the basaltes follow, and were the results of laborious experiments which enabled him to prepare the protoxide of iron, from the coal mines, in a manner that insured a finer grain, a better colour, and a more perfect incorporation in the mass; the pebble and marbled specimens were, as we have seen, first sent to Bentley late in the autumn of 1767; the bronze antique and encaustic Etruscan followed, and were ultimately perfected in 1769; and our earliest notice of the term 'jasper' occurs in 1775. Exquisite articles were produced in this new body in the following year; and in 1777-8 absolute certainty in the firing of this delicate composition crowned Mr. Wedgwood's untiring labours. The term antique must be taken in its generic sense as applied to form, rather than to colour and decoration; though after 1769 it seems to have been more specially applied to the black or red bodies, on which were painted, in encaustic colours, designs taken from the vases of antiquity."

Concerning his flower-pots we have this:—

"The variety of the root-pots, flower-pots, and bough-pots in colour, form, body, and decoration, exceeds belief. At first the common red flower-pots, as those also of grey and white stoneware, were taken up and improved. The first by the addition of colours in various ways; the others by drapery or simple medallions in cobalt blue, or by moulded patterns. The famous green glaze was also applied to flower- and bough-pots; and when Mr. Wedgwood had brought his cream ware to perfection, flower-pots in this body were as popular as the dinner-ware. They were fluted or hooped; the hoops and sometimes the cross bands being of various colours, or else perforated or traced at the edges, festooned, dice-worked, or enamelled. Many of the patterns popular on the table-ware were represented on the flower-, root-, and bough-pots; and from his enamelling bills we find that much of Rhodes's exquisite skill was expended in this direction. The husk, the vine, and ivy were favourite patterns. Goats' heads, griffins' heads, masks, and dolphins were used for handles. The basaltes and terra-cotta bodies were next tried, and more classical forms adopted. Bas-reliefs in white biscuit were applied; and stands, pedestals, plinths, and tripods were variously used as supports."

Bentley had made attempts to carry out the highest artistic work—he had looked around him for a modeller—that modeller was Flaxman. Wedgwood's words in response, are memorable. "I am glad you have met with a modeller, and that Flaxman is so valuable an artist. It is but a few years since he was a most supreme coxcomb, but a little more experience may have cured him of this foible." This must allude to Flaxman's competition for the gold medal of the Royal Academy, and his subsequent disappointment. Reynolds, who knew comparatively nothing of sculpture, and too often depreciated its merits, showed little judgment in his award of the prize to an inferior artist like Engleheart. Time proved that Flaxman's certainty of success arose from no overweening conceit of his own merit, but from an intuitive perception, however offensively expressed, of his possession of high artistic power. But, as yet the world saw only an untutored stripling, in whom self-reliant genius wore the appearance of vanity. Wedgwood, who always visited the Academy's exhibitions, had probably caught the current story, and bore it as we thus see in his vigorous memory.

The subject of the bas-reliefs on the Portland vase, as well as its age and place of production, are still matters open to conjecture. Miss Meteyard says:—

"With respect to the first every critic has differed. The Italians and French first entered upon the discussion; and the introduction of the vase into England was a signal for the critics here. Mr. Charles Greville, who published some very fine engravings by Bartolozzi of the vase, considered the bas-reliefs typified the death and resurrection of Adonis. Darwin, who consulted Warburton's Divine Legation, and many other works, thought the bas-reliefs bore reference to the Eleusinian mysteries, and this, with some trifling difference, was the view adopted by Wedgwood in his pamphlet on the vase. Another critic, Dr. King, in entire ignorance of the arts of antiquity and their best periods, conjectured that these designs bore reference to the birth and acts of the Emperor Severus, whilst a far more learned and enlightened critic of our own day considers that one of the groups represents Peleus approaching Thetis. These critical differences might be repeated to a wearisome extent. It is on the whole perhaps safest to conclude, that the subjects of the bas-reliefs are simply a heathen and poetised allegory on the trials of human life, and its close. Such vases, as in the case of the Greek encaustic vases prepared for the Olympian games, may have been designed with a view to a general purpose, rather than a particular one. Of the vase itself, if it does belong to the best period of Grecian art, that prior to the age of Alexander, it may have formed a portion of those innumerable spoils which we learn from Livy, Plutarch, and other writers were poured into Rome, as proofs of subjugation and conquest."

Wedgwood discovered that the Portland vase had been broken previously and repaired, as also that the bas-relief head which forms the bottom had belonged originally to some other vase or fragment of antiquity, and that it had been ground down and then inserted by processes far inferior to those used by the original artist.

The volume of which we have here given a taste is illustrated with 178 engravings on wood, by Mr. G. Pearson; and a portrait on steel of Thomas Bentley: Mr. Justyne and Mr. Tomlinson are mentioned as the draughtsmen employed.

We are enabled to re-produce one of the illustrations as an example,—a view of the *Wedgwood Memorial Building* now in course of erection in Burslem, in Staffordshire, and intended to include a Museum of Ceramic Art, a School of Design, a Laboratory, and a Free Public Lending Library. The architect is Mr. Robert Edgar, of London; and the windows, doorways, and cornices will allow of the introduction of terra-cotta. Portraits of Wedgwood's friends and of celebrated potters painted in majolica colours will fill the spaces of the arched window-heads, and over the chief entrance panels in jasper ware will be introduced. A considerable variety of external colouring will distinguish the building.

## SKETCHES ON THE SOLWAY.

Boatswain.—Heigh, my hearts; cheerly, cheerly, my hearts; yare, yare! Take in the top-sail.—*Tempest.*

What with wars on the continent of Europe, and rumours of war in certain provinces of Asia, we are afraid that "our countrymen" must be content to gratify their travelling propensities more at home for a time. We must confess that we do not see this necessity, so enforced, is altogether a sad one. There are thousands of unfrequented places and undiscovered nooks in the British Islands: silver lakes, gentle streams, mountain passes, highland forests, lonely moors, and impassable morasses, which in many respects are richer in the qualities of yielding health and pleasure, or even in furnishing the materials for philosophy or romance, than the much-vaunted regions of the Alps or the Rhineland.

Derwentwater may not be so large as Lucerne, nor so imposing as Lausanne, but it is equally beautiful, we think. Skiddaw is not so tall as Mont Cenis, nor is Helvellyn, take it all in all, so dangerous as the Matterhorn. But the true pilgrim of nature will find as much rational enjoyment at the English lakes, or on the Scotch mountains, as in the regions of alpine Switzerland; and if more danger be thought indispensable, he may traverse the rocky gorges of Ben Machdui, explore the solitudes of Assynt or Glencoe; paddle a canoe in Corrivrechian, or pay a visit to Macleod's Maidens, in the Isle of Skye. And why should it be, let us inquire, that the Wicklow mountains and the

Lakes of Killarney should fall out of fashion so suddenly? The Fenians, we shall be told. Well, after all, the Fenians have not risen to the high strategetical standards of Italian brigands, who wage war on unfortunate neutrals, and carry off poor travellers as political prisoners, demanding a heavy ransom, under the pain of death.

For ourselves we confess that we are never so well satisfied as at discovering new beauties, or new channels of interest, or of industry, in our own country; and putting aside the question whether the landscape may or may not be surpassed across the Channel, probably the superiority of the human interest—the value of the figures in the foreground, so to speak—is always to be found within the high-water mark of the British Islands.

Such, gentle reader, were the sentiments which fired our patriotic breast as we set our faces northward the other day with the intention of rusticating a fortnight among the mountains. We first thought of penetrating into the Hebrides. But a sudden change of the weather, a fall of the barometer, and a heavy south-wester from the Atlantic, overtook us at Carlisle, and speedily produced a change in our intentions. In the long run, after some of the natural hesitation which is proper to such circumstances, we finally cast anchor in the old-fashioned but picturesque town of Dumfries on the river Nith, close to the northern coast of the Solway Frith. The general result of our information so obtained we shall now try to convey to our readers, under the impression that it is one of the great blessings of our modern civilization—of our railway system in particular—that we can always, within the limits of a single day's journey, procure such a change of air, of scenery, of food, and, when necessary, of exercise, as we did. The art of preserving the health has, in this way, become much simplified, and is unquestionably improved. We shall not at present enlarge upon this grand principle. But we cannot help, speaking from experience, pointing out that half the money people spend in treating medicinally their poor physical constitutions would be attended with far greater and more lasting benefit if spent in the country. It is only necessary, we will add, that an interesting part of the country be selected; and we are quite sure there are few places more interesting, take it all in all, than the Solway Frith.

Regarded as a marine water, or rather as a tidal estuary, the Solway Frith, in the depth of its channel, in the character of its beach, and, above all, in the phenomena of its tides, differs from any other frith in the British islands. There is, indeed, it is often alleged, no other tidal phenomenon of a similar character in the world, and we may try briefly to explain it. If we take our stand at the point where the estuary expands into the Irish Sea, or immediately off the Mull of Galloway, we shall find that the tides, which come in one slow and majestic current across the Atlantic, encounter the long point-blank obstruction of the island of Ireland, are divided and forced to take a lateral current in opposite directions, and sweeping round the ends of that country enter the space between Ireland and the opposing coast, and are again subjected to another revulsion. These opposing currents finally rush against each other, almost surrounding the Isle of Man, and directly in front of the Solway, producing a perfect tumult of collision and even in calm weather a surgy and stormy-looking sea. Moreover, there results from the confluence of the opposing currents a sudden *elevation of level*, which rushes up the Solway like a racehorse, to which it has been sometimes appropriately compared, and penetrates in one heavy tidal wave through the channels of the estuary.

Over a distance of probably about twenty miles from its head, the whole of its bed, excepting the narrow and canal-like channels of the Nith and the confluent waters which enter near the eastern extremity, is alternately a surgy brown sea, now misty with sand, and now tinctured with silt, oscillating with the rebound of the tide; and a naked, flat, unrelieved expanse of sand—a miniature Sahara, so to speak—interposing its dreary projection between the blooming slopes of Cumberland, and the finely-outlined and warmly-tinted lands of Scotland. Much of its beach, or rather of its bed, even its broader and more seaward parts, is of the same character; so very much, indeed, that were the frith estimated or measured only by the space it covers at low water, it would figure in exceedingly limited proportions. All its tides are rapid, and constitute rather a rush or careering race than a flow or a current of waters. A spring tide, but especially a tide which runs before a stiff breeze from the south or the south-west, careers along at the rate of eight or ten miles an hour. It is often heard by the people along the shores upwards of twenty miles before it reaches them; and it approaches with a hoarse and loud roar, and with a brilliance of physical demonstration, incomparably more sublime than if the whole sandy waste were covered with charging cavalry.*

There are, of course, different degrees of this remarkable phenomenon. During spring tides, says McDiarmid, and particularly when impelled by a strong south-wester, the Solway rises with prodigious rapidity. A loud booming noise indicates its approach, and is distinguishable at the distance of several miles. At Caerlaverock and Glencaple, where it enters the Nith, the scene is singularly grand and imposing; and it is beautiful to see a mighty volume of water advancing foam-crested, and with a degree of rapidity which, were the race a long one, would out-match the speed of the swiftest horses. The tide-head, as it is called, is often from 4 ft. to 6 ft. high, chafed into spray, with a mighty trough of bluer water behind, swelling in some places into little hills, and in others scooped into tiny valleys, which, when sunlit, form a brilliant picture of themselves. From the tide-head proceed two huge jets of water, which run roaring along, searching the banks on either side,—the antennæ, as it were, which the ocean puts forth, and by which it feels its way, when confined within narrow limits.†

Under such circumstances fatal accidents are very frequent on the Solway; and we believe the fact is that the oldest inhabitants are often taken unawares when they try to cross the sands. As to the mariners, their case is, if possible, a harder one. Intimate knowledge of the peculiar navigation is requisite to guide vessels at the recess and influx of so unwonted a tide; and instances have occurred at Glencaple and its vicinity, of masters, acquainted from their youth with the Solway, having suffered their vessels to be wildly played with by the careering invader, and even tripped fairly over, and laid on their beam-ends. The shifting sandbanks, too, render the channel extremely precarious; and, indeed, the navigation of the Solway, from the variety of its conflicting forces, both of winds and of tides, is often a dangerous and always a difficult task. We may add that the slowness of the ebb bears an inverse proportion to the speed of the tidal flow.

"Love swells like the Solway,
But ebbs like its tide,"

says Sir Walter Scott; and we have no doubt the description is true! In point of fact, the average flow of the Solway is four hours, and its ebb six hours.

There can be no doubt that this extraordinary force of tide is unparalleled in the British Islands; and if we except the stream-tides of the Bristol Channel, we have nothing at all approaching to it. But the local topographers are, we suspect, somewhat rash in pronouncing it to be unique; for undoubtedly the same thing may occur in any restricted channel, and the wave need not always be a result of the tides. In the Mediterranean, for example, that tempestuous wind called *Euroclydon*, by some commentators described as an east wind, but at all events that wind which drove St. Paul on the island of Malta, where he was wrecked, is quite an analogous phenomenon.‡ Such winds are common on the Mediterranean, and, in fact, are known by the modern nautical term of *Levanters;* and although, of course, there is no tide worth speaking of in that inland sea, the dynamical action of a powerful wind, even on still water, is quite sufficient to produce the same effect. Our object here is not to underrate the scientific importance of the Solway tides by any means, but to keep such phenomena within the boundaries of what may be described as the aberration of physical laws.

The geology of the estuary is full of interest, if this were the place to discuss it. We cannot, however, enter on the great subject of its physical conformation, which would lead to a long inquiry as to the nature of the rocks which constitute its headlands. We shall just mention generally that on the northern side a brown or reddish coloured sandstone, dipping generally toward the Solway, and supposed to be a continuation of the red sandstone formation of Cumberland, stretches athwart the southern part of Dumfries-shire; and proceeding northward, merges in a reddish-coloured limestone, succeeded by blue limestone and coarse white sandstone. Near Dumfries and Lochmaben the sandstone is red; near Langholm and Sanquhar it is grey; and at Cove, near Kirtlewater, it is of light colour and solid texture, affording a fine material for pillars. The sandstone, where it crops out, is frequently incohesive, and is called till-band; but by being followed in its dip, it is usually found sufficiently compact to be used for ridge-stones, lintels, and for all the higher purposes of building. In each of the three great divisions of the northern county, limestone is worked in large quantities for sale. In Annandale the quarries are most numerous, but are each greatly inferior to the quarry of Closeburn, in Nithsdale. On the Cumberland shore the clay slate and carboniferous formations are also very productive in an economical point of view. But the coast on that side is more silted up and unnavigable than it is on the northern coast. This silting up is a subject of very great importance. Viewing the estuary of the Solway as a whole, it is more than one-half choked up by drifted sands brought forward by inland drains on the one hand, and returned again to a tidal terminus on the other. From Maryport to Sandsfield, the beginning and the end of the Solway on the south side, there is an almost continuous tendency to the deposition of silt upon the coast of Cumberland. With the exception of a jutting point at Bowness, indeed,—which stands out boldly to the north, and presses on the red sandstone of the Scottish coast,—from the force of the figure of the estuary, and the tendency of diluvial beds to press upon rocks,—the entire line is favourable to the gathering of deposits, which constitute, of course, the main cause of the travelling beaches of shingle and shifting banks of sand. This line of the shore from Maryport to Sandsfield also corresponds with the zone of limestone and the coal measures southward, and is, in truth, a regular curve, with a breadth of ten miles intervening, through which the Wampool and the Waver flow from the uplands. To conclude this subject, it has been found, that estimating the Solway Frith from Maryport to Sandsfield, upwards of 100,000 acres of sandbanks are either dry at low water, or nearly so. Such a waste of British territory, and so much detriment to navigation on the narrowest zone of England, is surely deserving of the attention of our engineers and hydrographers, for the means of reclamation are simple, and the process is assisted by nature.*

We should explain, in order to save misapprehension, that geologists and hydrographers are not always at one as to the geographical limits of the Solway; and as to political boundaries, these are sadly at a discount in our day. But, for fiscal purposes, it is worth noting, that the Commissioners under the Salmon Fisheries Act have fixed the boundaries of the Solway at its embouchure—on the south as far as Whitehaven, in Cumberland; and on the north as far as Barrowhead, in Galloway.†

We may here also devote a few words to the celebrated Lochar Moss, which derives its existence from the same physical causes. It is not so celebrated as the Chat Moss, we admit; or, rather, we ought to say, it is more known in connexion with troopers than with railways. But it is a very remarkable moss for all that. It lies intermediate between the lower parts of Nithsdale and Annandale, Dumfries-shire. It stretches northward from the Solway Frith in a stripe, 10 miles long, and from 2 miles to 3 miles broad, and, over its whole extent, is nearly a dead level. Tradition asserts it to have been originally covered with wood; next inundated by the sea, and converted into a bay navigable to nearly its head; and next choked up by the wreck of vegetation and the deposits of the Solway tide,

* See the "Imp. Gazetteer of Scot.," under the head "Solway." It is strange that there is no reliable guide-book to the Solway Frith. Black's excellent tourist, generally so full and accurate, is very defective regarding this quarter of Scotland.

† See McDiarmid's "Pictures of Dumfries." A very stirring and picturesque, although, of course, exaggerated account of the Solway tides will be found in Scott's novel of "Redgauntlet."

‡ This term, "Euroclydon" (from Gr. *euros*, a south-east wind, and *klydon*, a wave, from *klyzo*, to wash or dash over), contains, it is curious to note, the etymon of the Clyde, both in Scotland and in Wales. For the account of the tempestuous wind raising great waves in the sea, which drove ashore on Malta the ship in which St. Paul was sailing to Italy, see Acts xxvii. 14, to the end.

* Some valuable hints on this subject will be found in a little work by Mr. Rooke, of Akehead, Cumberland, entitled, "Geology as a Science." London. 8vo. 1858.

† See Mr. Ffennell's Report, 1864.

and thus transmuted into a morass, at first impervious, but gradually consolidated into a bog. The peasantry around it preserve the tradition in the following couplet:—

"First a wood, and then a sea,
Now a moss, and aye will be."

This prophecy, like many other wise saws, ancient and modern, has turned out inaccurate; for the loch, or moss, as it is obviously called, is now in a great measure reclaimed and cultivated. But there can be no doubt it has been one of the most extensive morasses in all Scotland. Robert Bruce,—it is said, on some historic authority,—could not pass the moss in his progress from Torthorwald Castle to meet Comyn at Dumfries, but pursued the very circuitous route of skirting it round by the Tinwald hills. The moss, even so late as his time, seems thus to have been impassable; but it is now traversed by a railway and several lines of road, most of them excellent, but, to a stranger, sometimes curiously elastic beneath the motion of a heavy-loaded vehicle, particularly on the bye-roads. There can be no doubt, however, that this Lochar Moss will be finally subjugated; and it would be well for Ireland if her bogs were as securely solidified or in any other form utilised and made so available.

Whoever wishes to produce an exhaustive description of the Solway Frith,—a feat which we do not wish to undertake,—must devote a large amount of attention to the condition of its ports. Of these the two principal on the Cumberland shore are Maryport and Silloth; on the Dumfrieshire coast, Port Annan and Dumfries.

Some years ago, a fierce local controversy arose, more particularly between Port Annan and Silloth, as to which ought to be considered and made suitable as the central port on the Solway. The investigation for this purpose disclosed the long-neglected state of the Solway, and also its capacity for easy improvement. It might, in fact, said the enthusiastic Annanites, be made the Mersey of the Border districts, whose waters it has always drained, but whose sands now impede its navigation. Carlisle, then, was to be Manchester, and Annan was to be Liverpool. The truth is, that of the three great rivers, the Nith, the Annan, and the Esk, which drain into the basin of the Solway on the north, the Annan is the most suitable for the purposes of navigation; the others, from the fact that they widen out so much at their embouchure, and therefore being destitute of a thorough scour, make such prodigious deposits of sand and silt at their separate deltas, that they have caused the Solway to recede further and further from its shore.* Besides, Annan, from the circumstance, among others, of entering the basin at nearly right angles to the channel of the estuary,—as well as having a good tidal rise (18 ft. to 20 ft. in spring tides, 10 ft. to 12 ft. in neaps), which with the 8 ft. to 10 ft. of water in its channel gives a depth of from 19 ft. to 28 ft., according to the tide,—had all the engineers in its favour. The antiquaries, too, gave their vote and interest for Annan, for it is undoubtedly one of the most ancient towns in Scotland, having received its first charter from King Robert the Bruce, who, it should always be remembered, was lord of Annandale and feudal superior of the ancient and royal borough.† It had, to be sure, an awkward reputation in the matter of contraband commodities. But the duties on whiskey between England and Scotland were now equalised; and even the Isle of Man had ceased to be a depot for cases of brandy and kilderkins of hollands. These considerations were clear enough, and carried with them their own weight. Still, no friendly hand was extended to guide the Solway channel from Annan to the sea, as had been done so generously at the Clyde. The former channel, therefore, continued to take whatever direction shore works, river floods, storms, accidents, or other causes might give it; so that the "spits" or the shoals and sandbanks still appear and disappear in its seaward course.‡

With great reluctance, then, Annan was forced to yield to her English rival, Silloth, in the question of harbour and docks. But at length, about three years ago, the initiatory steps were taken of another railway extension scheme, which we believe will turn out of greater use, not only to Annan and the northern shores of the Solway, but to the nation at large; and, we may also be permitted to hope, to the spirited shareholders. We refer to the line known as the Solway Junction Railway, which consists of an iron bridge across this estuary from Annan to Bowness, and is intended to connect on the opposite shores of the Solway the railway systems of England and Scotland. Those who were acquainted with the force of tides in the Solway, and the shifting nature of its bed, at first pronounced the project sublime. Nevertheless, it presented few engineering difficulties. On a preliminary survey of a section of the river bed at its narrowest part, immediately opposite Annan, it was found that a few feet beneath the overlying sand there was a level plateau, partly of gravel and silt, and partly of clay, admirably adapted for the nature of the required works. Besides, Morecambe Bay had already been successfully crossed from the Westmoreland to the Lancashire coasts, and the engineer, Mr. Brunlees, was the same in both cases.* After a spirited Parliamentary campaign, in which comparatively small opposition had fortunately to be encountered, the bill passed both Houses, on the 30th of June, 1864, and the operations of construction were soon after commenced. This singular railway is intended to form a junction with the Caledonian at Kirtlebridge on the north, and with the Carlisle and Silloth and Carlisle and Maryport Railways on the south of the Solway. It will make a considerably shorter cut between the west of Cumberland and Glasgow and Edinburgh, and it will, it is expected, give greater facilities for the development of the mineral traffic on both sides of the Solway.†

An inspection of the operations on this line between Annan and Kirtlebridge, which we made during our visit, leads us to conclude that the portion of embankment yet to complete near Bell-springs,—about 60 ft. in length and of an average height of about 8 ft. or 10 ft.,—will be done in a fortnight or three weeks; and that the few yards of rock-cutting yet to excavate at the summit of Corsehill ridge will be accomplished in about the same period of time. When these two portions of earthwork are completed, the engines in use on the line will then have a continuous run of nearly five miles in length,—that is, from near the farm-steading of Williamwood to the tip of the embankment now approaching the beach at Seafield. We believe it is intended in the meantime to extend the embankment from the tip to Seafield at a considerably lower level than is shown in the section of the line, with the view of proceeding immediately with the formation of the embankment and stone-work that will intervene between the beach and the commencement of the ironwork of the viaduct. The completion of a continuous line from Corsehill rock-cutting to Seafield will enable the materials for this purpose to be brought down to Seafield with great facility by means of the two locomotive engines now in use on the line. In the course of another month, we believe, the driving of the foundation piles of the viaduct will be completed, when the erection of the superstructure will be rapidly pushed forward, the materials for that purpose being all in readiness. Owing to the difficulties which have been encountered in sinking the foundation piles, and the delays and interruptions thereby occasioned to the progress of the work, the formation of the line on the north side of the Solway is in a much more advanced state than that of the viaduct, which is unquestionably the most serious part of the undertaking.

The ironwork of the viaduct is 1,700 yards, and will consist of 165 spans or bays of 30 ft. in width, and an opening span of 50 ft., supplied with lateral gates or folding bridges,—made under the supervision of the Admiralty,—for the passage of shipping to Port Carlisle. The pier of each span will consist of six hollow piles of 12 in. diameter, which are sunk to a depth of about 12 ft. or 13 ft.—about 4 ft. or 5 ft. thereof being through sand, and the remainder through band-till or gravel. The piles rise to a height of 30 ft. above low-water level, and support lattice girders, on which a double line of rails will be laid. Screw piles were tried last year, but they were found so difficult to screw into the hard subsoil that pointed piles have since been used, which are driven by Sissons & White's patent pile-driving machine. The foundation piles are expected to be all driven before the end of this month, and the fitting up of the superstructure will then be proceeded with in three sections. The superstructure of about 30 bays has been completed. The formation of the embankment which is to form the approach to the ironwork of the viaduct will be commenced immediately, rails having been laid down temporarily up to the beach for the purpose of bringing down from the cuttings earth for the embankments and stones for pitching. The pitched embankments to connect the ironwork of the viaduct with the shore will be about 240 yards in length, and of the average height of 25 ft. on the north side of the Solway; and of 650 yards in length, and of the average height of 30 ft. on the south side. The estimated cost of the line was 315,700*l.*, and as the main line and branches would extend to about 24 miles, the cost of the line, including the viaduct, would, according to the parliamentary estimate, be little more than 13,000*l.* per mile. The engineer is Mr. Brunlees, of London; and the contractors Messrs. Waring Brothers & Eckersley.

We must now leave Annan for the opposite coast of the Solway, and point out what was doing all this time at the port of Silloth. People who object to the principles of free ports and free trade, and all those who are sceptical as to the natural development of local resources by the persons who are most interested, should study well the history of this prosperous little seaport; for the rise and progress of Silloth may well be compared to a flow of the spring tide in the Solway. The town overlooks the pleasant bay, from which it takes its name, on the Cumberland shore of the Solway Frith. Little more than a dozen years have passed since the site was still an unbroken waste—a dreary expanse of sand-hills, with no human habitation. The bay from time immemorial had been well known, and much frequented by mariners as a harbour of refuge; the only place of shelter in stormy weather, with deep water and sure anchorage, and accessible at all times of the tides, between the Clyde and the Mersey. Nevertheless, while ports much less favourably situated, as regards shelter and water, were springing into existence and flourishing on other parts of the same coast, the natural advantages of the Bay of Silloth remained unknown. For many years, indeed, a sleepy trade was carried on between Carlisle and various ports on the Scottish and other coasts, by means of a canal, 9 miles in length, communicating with the sea at Port Carlisle; and it was during the construction of a line of railway from Carlisle to the port, to supersede this canal, that the eligibility of Silloth Bay as a secure and highly advantageous haven for purposes of trade first attracted the attention of the mercantile community. This might be some fifteen years ago, when the want of a safe port on the north-west coast of England, which had long been felt, could no longer be delayed in its construction. It was under these circumstances that the Silloth Bay Dock and Railway scheme was launched in 1853. The promoters, who consisted chiefly of merchants and manufacturers connected with the trade of Carlisle, distinguished themselves by the enthusiasm and energy with which they pursued their aim. It was suspected that the project would be fatal to neighbouring ports, where a large amount of capital had been sunk, and where it was thought resources existed or might be found which would more than meet all the requirements of an extending trade. Notwithstanding these doubts and murmurs, the promoters lost no opportunity of publishing the "advantages" of Silloth Bay for the accommodation of shipping, as well as its favourable position for commanding an extensive coasting trade.

But these were not the only advantages on which they relied. A meteorological champion came to the front. The Rev. Francis Redford, M.A., incumbent of St. Paul's, Silloth, began those well-known series of observations—which have already attracted the attention of the Registrar-General;—and, in speaking of its salubrity, more particularly as shown by the great amount of ozone registered there, he de-described Silloth in glowing terms. Indeed, before a single sod had been turned, crowds of summer visitors were flocking thither. Silloth,

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* Rept. of the Tidal Harb. Commission, 1848.

† *Vide* Chalmers in "The Caledonia;" and Kerr, "Hist. of Scot. during the Reign of Robert II."

‡ Comp. "Rept. on a Southern Railway from Hawick, and on the Establishment of a good Solway Port." Prepared by Mr. Sewell, at the request of the town council of Hawick. Mr. Stevenson, C.E., of Edinburgh, had also, in 1848, pointed out facilities for floating docks at Annan.

* The conception of such a project is not a new one. Mr. Cutbertson, the ingenious editor of the *Annan Observer*, has pointed out in the geological work we have quoted by Mr. J. Rooke, of Akehead, Cumberland, a similar proposal, made so early as 1838. We need not refer to the Menai Bridge or the Plymouth viaduct, &c.

† Owing to the circumstance of seven of the leading townsman of Port Annan being concerned in promoting and carrying through this important undertaking, they have since acquired the sobriquet in a collective capacity of the *Seven Wise Men of Annan!*

in fact, had become widely known by name before one stone had been placed upon another for the formation of the town. At length a railway was made to it from Carlisle; and the curiosity which the highly favourable descriptions had excited, led to numerous excursions and pleasure parties. The place then began to assume shape and form, although only at first by very small and barely perceptible degrees; and before many summers had passed, Silloth was able to boast of the possession of something more than a name. At the present moment the little port is one of the most attractive places on the shores of the Solway, and the growth it has attained in a dozen years or so has been sufficient to encourage hopes of greater extension. The only difficulty that we can foresee is the necessary and often vital antagonism which must subsist between a watering-place and a busy seaport. But that is seldom conspicuous in the infancy of a town, and need not operate unfavourably against the continued prosperity of the port of Silloth.*

There are many other interesting little towns and watering-places on the shores of the Solway, most notably Dumfries, to which we may return in another article.

## THE SUPPLY OF SOFT WATER FOR COUNTRY HOUSES AND COTTAGES.

A supply of pure water is one of the first essentials to health: and while engineers are devising schemes for a better supply to the metropolis involving the expenditure of millions, a few words may not be out of place as to the provision for villages and isolated houses. The artificial condition of a large town requires artificial means to supply its wants, but in the country, where such causes do not prevail, a proper care of that which nature sends is all that is required.

No water is purer, more wholesome, or more economical in its use, than rain water, and sufficient of this falls on every house in the course of a year for the use of its inmates.

The want of water has been very severely felt by the poor during the last two dry summers. In this neighbourhood (the Fens) wells can only be sunk to a small depth, the lower strata yielding water that is brackish and unfit for use. These shallow wells depend for their supply on the "soc," or "socage," of rain water through the surface of the ground; and as a natural result in a dry season, the source of supply being diminished, the wells soon fail. In many places the farmers have had to lead every drop of water that was required for their yards and houses a distance varying from one to three miles, and the water thus obtained is exceedingly impure. The cottagers have been dependent on the good nature of those neighbours who possessed a water-cart, and instances have occurred where they have been obliged to give a penny and twopence a pailful for water that has scarcely been fit for use. All this has arisen from a neglect of the stores provided so amply by nature.

Even where such scarcity has not existed, and where a river, or deep wells have afforded a constant supply, the water thus obtained can bear no comparison for purity or wholesomeness to rain water. Taking it only as a matter of economy, as an actual money saving, the supply from wells and rivers is far inferior to that which comes direct from the clouds.

Water is soft or hard in proportion to the quantity of saline matter it contains, or, to speak more correctly, the quantity of lime or magnesia. The bi-carbonate of lime contained in hard water destroys soap, and the harder the water the greater quanity of soap required for washing purposes. The same applies to water used for brewing, and for making tea, coffee, or other decoctions.

Water falls from the clouds pure and quite soft; as it percolates through the earth to the rivers and wells, it absorbs various salts, which render it hard and more or less impure. Rain-water that has fallen, and flowed over granite rocks, which are insoluble and impermeable, has been found to contain only 2° of hardness. An average of the hardness of the water of eight streams and rivers, in different parts of the country, gives 14·80°. Of the water of ten wells sunk through various strata, and at different depths, including the London clay, gravel, chalk, new red sandstone, and carboniferous rock, the average hardness gave 34°. Of the London water supply, from the Registrar-general's returns, the hardness varies (Dr. Clark's degrees), from 17·78° to 9·59°, and the average of the nine companies is 12·39°.

Each degree of hardness requires ten grains of soap to overcome it. Taking the supply of a labourer's cottage for washing at 50 gallons per week, water with 14° of hardness would require extra soap to the extent of 52 lb. per annum, which, at 3d. per pound, would come to 13s.; or with water of 34° of hardness, 118 lb. of soap, of the value of 30s., as the amount to be saved by the use of pure rain-water. This, perhaps, is not the actual result in practice, soda being used to overcome the hardness; but taking the extra quantity of soap and soda, the wear and tear of the clothes by the rubbing required when they are washed in hard water, and the saving in tea and coffee, the loss in a labourer's family in the course of a year from using hard instead of soft water, cannot be put at less than from 15s. to 20s.

For drinking purposes, no water can compare with rain-water; its freedom from organic matter, and from salts that are deleterious to health, make it far superior to hard water however sparkling and bright and pleasant to the palate. The few impurities that rain-water may absorb in its passage from the roof of the house to the tank, and the slight organic matter that may be generated during the time it is stored up, and which imparts the flat taste that is generally considered objectionable, may be easily removed and the water made bright, sparkling, and fresh, by putting it through a filter containing sand or small gravel and loose pieces of charcoal. A filter may be constructed at a very small cost, in the following way. Take a large flowerpot, or vessel of similar shape; inside place a saucer with a hole in it, of such a size that it will fix itself about the middle of the pot. On the saucer put layers of sand, fine gravel, and charcoal in lumps about the size of walnuts. The water to be filtered should be allowed to run on this filtering-bed from another flowerpot placed over it, and the hole at the bottom filled with a piece of sponge, to catch the first impurities. The water may be retained in the lower vessel until wanted, by a cork fixed in the hole at the bottom. This will he a very good makeshift for filtering water for drinking.

Having thus shown the superiority of rain-water over all other sources, the next point to consider is its storage. Taking only a low average for the annual rain-fall, say 25 in., and that a cottage and buildings cover 400 superficial feet, the quantity available for use would be 5,207 gallons per annum, or about 14 gallons per day, an ample supply for all washing, cooking, and drinking purposes. Allowing for sixteen weeks' supply, or 25 hogsheads, a tank would require to be 7 ft. 6 in. in diameter, by 6 ft. deep. It should be built of two rims of brickwork in mortar, and cemented inside, the top domed over, with a man-hole covered with a York slab and iron ring. The cost of such a tank would, with pumps and lead pipe, be about 9*l*., and the interest on this, at 5 per cent. would be nine shillings per annum, or a little over twopence per week, the amount generally charged by water companies for a supply of water to cottage-houses in towns. Of course, where several houses are together, one large tank for the supply of the whole could be constructed at a much less cost per house.

A 12-hogshead tank is generally considered sufficient to provide a supply of soft-water for a cottage; but in times of drought, when water is most difficult to obtain, these fail; and, from the above calculations, it will be seen that with so small a cistern one-half the rain that falls would run to waste.

These remarks as to waste of rain-water apply still more forcibly to farm-steads. How often may a whole range of buildings be seen without any provision for catching the rain, the water in wet weather running off the eaves, wetting the walls and soaking the foundations, rendering the whole place damp and unhealthy, destroying the mortar, and rotting the woodwork. And then, in dry weather, a man and horse have to be constantly employed in leading water for the supply of the buildings. Thus, for the want of a small outlay in the construction of a tank, pure, good, wholesome water is allowed to be a source of harm and injury to the structure of the buildings and the health of the inmates, and inferior water has to be fetched at a cost far greater than the interest on the outlay necessary to preserve the rain-fall.

W. H. Wheeler.

## OUR RIVERS AND DRAINAGE.

"Doctors differ."

I fear we are getting very much at cross purposes on the subject of the pollution of rivers, the best remedies that can be used for the prevention of the same, and the application of the sewage refuse for agricultural purposes; but Parliament, no longer satisfied with the conduct of the authorities of our towns, who turn a deaf ear to the repeated warnings and advice that are given to them, and still persist in discharging all their drainage into the nearest river or brook, regardless of the injury they inflict on the public health, and the misery they cause humanity, has, in the plenitude of its wisdom, taken a most important preliminary step by the passing of the "Thames Navigation Act," by which Act it is decreed that heavy penalties shall be inflicted on the authorities of those places which continue to discharge their sewage into that river, and pollute the water so bountifully bestowed by Providence as a blessing to man. The provisions of this Act were the result of an elaborate and pains-taking inquiry of the River Commission, when all the evils of river pollution were thoroughly investigated and sifted, and deductions drawn therefrom; and that same indefatigable Commission is now extending its inquiries and researches into other localities, having paid a flying visit to the Yorkshire rivers, whence it has gone to the south, in the neighbourhood of Swansea.

If every river is to occupy the time that has been bestowed on the Thames between the first inquiry and the ultimate legislation, much valuable time must elapse, and in the meanwhile the evils of further pollution are being carried on, and will be materially extended, in the absence of any enactment to the contrary, as works are now being laid out very extensively for continuing the system, regardless of the views of the Commission, or of Parliament, or any fear of Government interference or authority.

Much of this evil of passive inaction or obstinacy, in carrying out their ill-considered and incomplete systems of sewerage, arises in a great measure from the off-hand, ill-digested opinions given on the subject by *savans*, leaders of the sanitary movement, who are supposed to be *au fait* on every point connected with the public health, and I will call attention to an opinion given by one of them, Dr. Letheby, before the committee of the House of Lords, on the Sheffield Water-works Bill, wherein he stated that the accumulated and concentrated sewage of all Sheffield discharged into the river Don would not "theoretically," or sensibly, affect the supply of water derived from the same river for the inhabitants of Doncaster, some twenty miles off, as, by a process of self-purification, the water in its meandering

* We are indebted for some of these observations to a recent article in the *Scotsman*, from which we also select the following facts and figures as to the prosperity of Silloth:—An Act of Parliament was obtained in 1855 empowering the company by whom the scheme was started to make a railway connecting Silloth Bay with the line then in progress between the city of Carlisle and Port Carlisle, to excavate a floating dock of four acres area, and to construct a pier 1,000 ft. in length. The railway was opened in August, 1856. The dock was commenced in 1857, and opened, amid great rejoicing, in 1859, by the late Sir James Graham, M.P. for Carlisle. The dock was named the Marshall Dock, in honour of Mr. Wm. Marshall, M.P. for East Cumberland, who had taken an active part in the undertaking. Several first-class steamships at once commenced to ply between the bay and Dublin, Liverpool, the Isle-of-Man, Dumfries, Annan, &c.; so that now the steadily-increasing trade, both coasting and foreign, seems likely to lead to an extension of the dock accommodation at no distant time. More room is already required for the shipping than can well be afforded. There is a depth of water in the dock-sill to admit ships drawing upwards of 20 ft. The loading of the shipping, as well as the opening and closing of the dock-gates, which are 60 ft. in width, are all effected with great despatch by means of hydraulic machinery, invented by Sir William Armstrong, and fitted up under his personal superintendence. The arrangements for the conveyance of goods and passengers down to the vessels are very complete, as the rails of the line connecting the port with Carlisle, Newcastle, Edinburgh, &c., are laid on the quays. The line, in 1862, was leased by the North British Railway Company, who had done much to improve the trade of the port. A still further stimulus, it is expected, will be given to the trade in the course of a few years by the opening of the Settle and Carlisle Midland Railway and the Solway Junction Railway. By means of the former line, the bill for which has just received the royal assent, the large manufacturing towns of Yorkshire will be brought into direct communication with Carlisle and Silloth; and the Solway Junction line, which is already in course of construction, will open out an important coal-field for the shipping of the port. It should be mentioned that the bay has the advantage of a natural break-water, to the west and south-west, in Silloth Bank and Robin Rigg, which overlap each other and arrest the ocean swell, so that in the heaviest gales there is little more than surface waves."

course, bubbling over gravelly shoals, or in the stagnant (subsiding) deep water of the bends of the river, it would deposit or lose all its feculent matter, and be perfectly pure and innocuous at Doncaster. But the learned gentleman did not consider, or, perhaps, was not aware, that the same river was a navigable one; and whatever feculent or solid matter was deposited or lodged on the banks, was being perpetually stirred up by the vessels navigating the river, to and fro, and the water delivered at Doncaster was in almost as foul a state as when the sewage entered the river at its *debouchere*.

The Doncaster Corporation, who most strenuously opposed the waterworks scheme, produced evidence to show there was considerable foulness and discolourization of the water of the river at Doncaster, and this foulness, there was not the shadow of a doubt, proceeded from the sewer discharged into the river from the towns situated above, on the course of the River Don.

This opinion, given by so well-known a man as Dr. Letheby, has been the subject of considerable local comment and discussion; and, I believe it has been the means of postponing or suspending the consideration of practicable and feasible plans for remedying the crying and grievous evils arising from the pollution of the River Don; as corporate bodies, from their inherent composition, are never at the best of times foremost in the ranks of philanthropic and good works, and they are delighted to find a plausible pretext for delaying the promotion of this very urgent and necessary measure.

Again, the pollution of the rivers was the subject of consideration and discussion at the meeting of the British Association at Nottingham, introduced by Sir J. E. Alexander. He pointed out fully the evils attending it on the Scottish rivers, destroying all life in the waters, and making the rivers dangerous to live near; and the discussion was continued by Dr. McAdam, who followed in support of the paper.

But I wish to draw attention more particularly to the observations of Professor Bennett, who said he believed it was a mistake to suppose that offensive odours were necessarily injurious to health, and from that mistake much energy was displayed by medical officers and boards of health in a wrong direction. He admitted the destruction of fish was a serious question, as depriving the people of an important article of food. He further observed, "This anxiety to get rid of offensive matter arose from the belief that it was injurious to health, and must be removed at any cost. He did not mean to say that bad smells are absolutely good things, but he maintained that excretal matter was not nearly so injurious to health as was generally supposed." "*Cesspools were otherwise.*" After saying that sewage and cesspool matter should be turned to the land instead of the water, and then we should have pure rivers, he advocated large manufactories for making sewage into guano near all large towns, as a matter of national importance, and if there was a little smell, we must not think it productive of evil, and therefore put it down.

If this doctrine be sound and logical, how is it that in those towns that are effectually and completely sewered and drained of all excretal and other matter, the rate of mortality is considerably less than in those places where partial drainage has taken place, or where the cesspool system still exists. The Registrar-General's returns show that this is the fact, and ought to convince the most sceptical that nothing but the most perfect and thorough drainage of our towns, with an ample and good supply of water, and other necessary sanitary measures, can make them fit and suitable places of residences. Remove every object that produces, or is likely to produce, offensive odour, and you remove the chief cause that creates a certain class of diseases. Give me, notwithstanding what Professor Bennett says, the pure air of heaven, and a clear atmosphere to breathe and live in.

As to the proposal of establishing manufactories near every large town, I believe it has been fairly tried at Leicester, Cheltenham, and other places, and has turned out a total failure; and I am of the opinion that has previously been expressed in the *Builder*, that the best system that can be devised for towns that are situated on the same drainage area is to unite and carry away their sewage by a common outfall to some point below, either in the delta of rivers, or on low, weak, uncultivated, and unproductive land, and there to dispose of it in a liquid state for agricultural purposes; or, if more advantageous, at times to deodorize and filter it, and manufacture it into a portable manure; and depôts might be formed on the course of the outfall to serve intermediate agricultural districts if thought desirable. Oulets should be provided to carry off an excess of rain or storm water, so that the sewage may be as full of solid matter and as concentrated as possible.

Another *ignis-fatuus* appears in the person of Dr. Hawksley in the *Times* of September 14th. He proposes to substitute earth closets for the system now in use, and to close up all sewers and drains, so that nothing noxious should reach our rivers to pollute them.

This proposition comes rather too late in the day, after twenty years' practice of the present system, which certainly has not in all cases worked satisfactorily, but only because many of our sanitary works have not been well and correctly designed, and are left quite incomplete, as I consider the proper outfall and ultimate disposal of the sewage the *sine qua non* in all town drainage works.

I think it will require a considerable amount of argument and persuasion to induce us to revolutionise the plans and works as now adopted in our towns; and, instead of throwing difficulties in the way, it would be much better for all philanthropists and scientific men to combine and put their shoulders to the wheel, to help our town authorities out of that slough of despond in which they have unwittingly engulphed themselves.

As many of your readers may be aware, Dr. Hawksley's proposition is not original or new: in the year 1849, a similar plan was suggested by Mr. B. Stratton, of Bristol, the drawings of which are now before me, in which he proposes the use of portable W.C. and manure-pans, with closely-covered tumbler carts, and manure-tanks, &c., complete, and these were to be removed in the same way as suggested by Dr. Hawksley; but he does not recommend earth as a deodorizer,—he employed the ashes thrown to waste on the premises for the purpose. This plan, although extensively circulated, did not meet with much countenance or support, I presume on account of its novelty, as Englishmen as a rule are not too prone to adopt any new scheme that may be suggested, much less crude and ephemeral ones. Subsequently other plans for a dry earth closet were proposed by the Rev. H. Moule, who took out patents for the purpose of securing all the rights and privileges appertaining thereto, and the plans of this invention were described in the *Builder*, vol. xx., p. 794, and approved of so far as special cases were concerned; but it was thought the difficulties were too great, the system too complicated, and so liable to neglect and mismanagement, that it was considered neither advisable nor desirable to adopt the plan suggested, and thereby supersede the present system of sewerage of London and other towns.

And why, I would ask, should London abandon her present system of sewerage, &c., after she has spent four millions of money in that extraordinary and magnificent work — the outfall sewer. She has made heavy sacrifices to get rid of her sewage, and carried it away below London to a suitable distance, where it may be profitably disposed of should the agricultural interest evince sufficient spirit and enterprise to perfect and work out the problem.

Would it not be the height of folly, if not something else, to revert to the system of collecting the sewage from house to house, when by the present machinery the whole may be speedily, effectively, and cheaply carried away by a simple flush of water through the existing system of sewerage; and may thus in its diluted state be applied in the most effective manner to our barren and waste land, and thereby enable the earth to bring forth her increase, and, to use a flowery metaphor of the *Times* correspondent, "to blossom like the rose"?

As I am not one of those opposed to all change, if it can be shown to be beneficial, or to the inevitable and irresistible march of intellect, if the system should be submitted to a practical test as an experiment; I would suggest that Manchester is a place peculiarly adapted for it: she has but partially drained her myriads of houses, and lovingly retains her *odorous* cesspools (ashpits) in all their glorious *sweetness* and perfection; and the result of this fond feeling is their frightfully heavy mortality. Let the dry earth closets be tried there, as the dry ashes as at present supplied to the cesspools do not properly effect the object; and if Manchester can be purified, made clean, and healthy by the process, why the rubicon will have been passed and success achieved.

I do not agree with the Doctor in his sneer about that noble public work, the outfall sewer: it is worthy of all praise, and has been skilfully and admirably executed; but I fraternise with him in his pithy protest against the great water supply schemes of Hemans, Bateman, and Fulton for modern Babylon.

I do not approve of those extensive, absorbing, grasping schemes. I do not think that because Paris is said to be all France, London is all England; and why should she monopolize the important sources of water supply named for the north and west of England?

Those parts of the country are becoming thickly populated; and many of the petty, miserable schemes of water supply on which the towns of those districts depend, must be abandoned, and more pure and copious sources of supply obtained.

Let London economize the resources of her own district: the chalk formation on which she stands is not exhausted, nor are the Surrey sands; and if these fail, is there not the noble River Thames to fall back upon? The supply of that river from the rainfall, if economized, would produce a prodigious quantity of water; and with the facilities afforded by the "Thames Navigation Act" to prevent the pollution of the river, if the water were properly collected in storage and subsiding reservoirs, and thoroughly and effectually filtered, it is capable of supplying the wants of all the inhabitants situated on its banks.

If our population increases so rapidly that the rainfall of the country will not yield the necessary supply, and in dry seasons now there is a scarcity and shortness of water in many districts, it becomes a question of very serious importance for us to economize and appropriate our water supply in heavy rainfall districts, that ample quantity may be obtained in all seasons and for all places; and that populous, rich, and wealthy places may not stretch beyond a fair and reasonable limit, and, by a *coup de main*, monopolize to themselves a necessary of life that was intended by an all-wise Providence for the use and benefit alike of all His creatures. B. B.

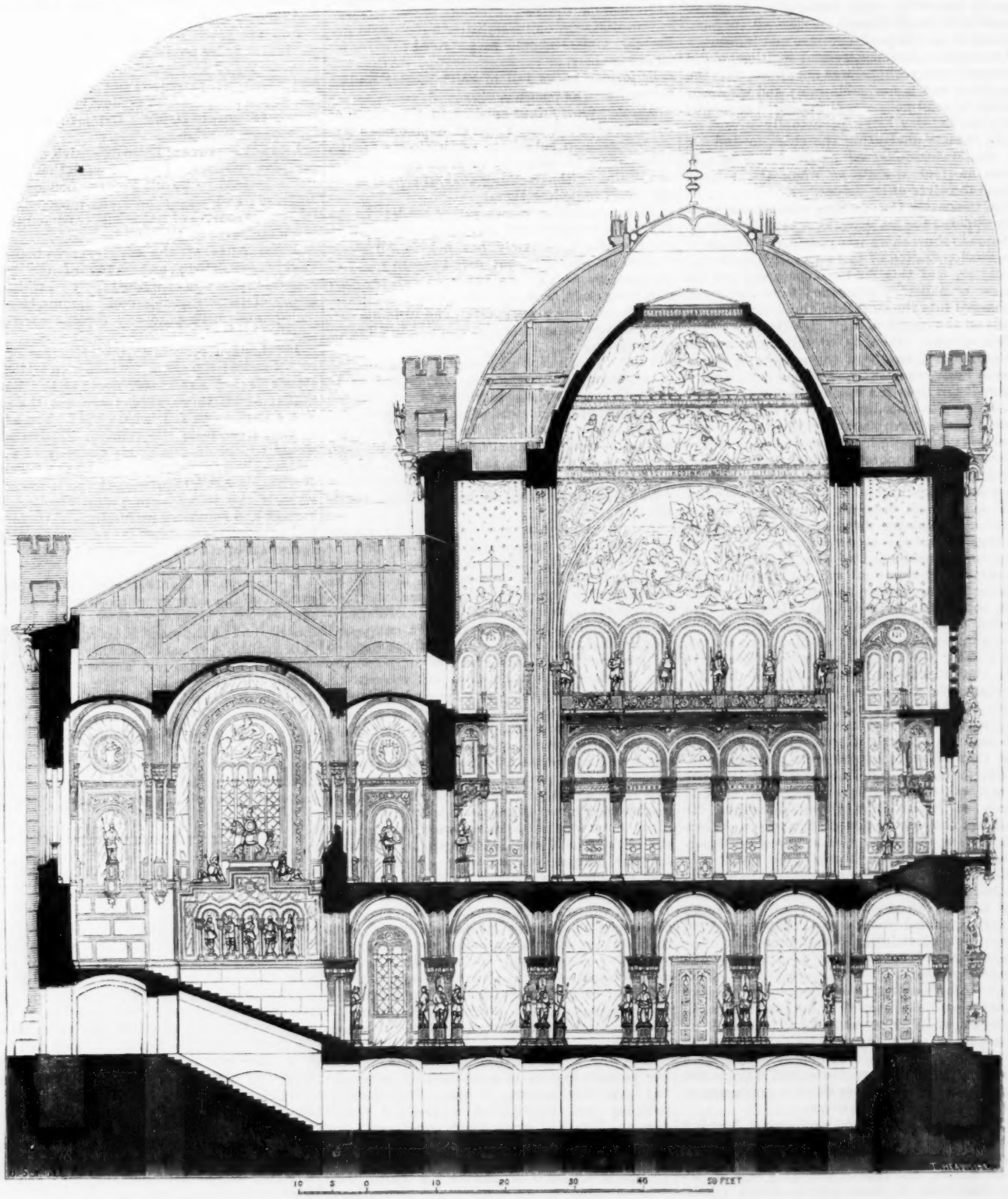
## THE ATLANTIC TELEGRAPH.

### GRAND BANQUET.

On the 1st inst. a grand banquet was given in the Law Association Rooms, Liverpool, to Captain Anderson, of the *Great Eastern*, and the gentlemen who have taken a leading part in the laying of the Atlantic cables. There were upwards of 200 gentlemen present, and doubtless as many more would have attended had an application for the rooms of the Town-hall been successful. The chair was taken by the President of the Board of Trade. Among the invited guests were Lord Stanley, the Bishop of Chester, Mr. S. Canning, chief engineer of the Atlantic cable; Mr. Henry Clifford, engineer of the same; Captain Anderson; Mr. Willoughby Smith, electrician of the Atlantic cable; Mr. Latimer Clark, engineer of the Atlantic Company; and many more, of well-known names.

The room presented a novel appearance. Festoons of the Atlantic cables, from which hung real seaweed and coral, were suspended round the cornices, and in recesses were placed gilt grapnels. In the centre of the room, a massive chain held suspended over the middle table the grapnel which finally raised from the bed of the Atlantic the long-lost cable of 1865. The lighter and more brilliant "effects" were produced by large mirrors fringed with evergreens and trophies of national flags—the ensigns of Great Britain and the United States being, of course, the most conspicuous.

The Chairman, after the banquet, read a communication from the Earl of Derby, conveying the sentiments and intentions of her Majesty with respect to the Atlantic cable expedition and its promoters. Her Majesty was desirous of testifying her sense of the merits displayed in this great enterprise, and had commanded his lordship to submit for special marks of her Royal favour the names of those who, having had assigned to them prominent positions, might be considered as representing the different departments whose united labours had contributed to the final result; and had commanded him to convey her congratulations to all whose energy and perseverance, skill and science,




THE MUSEUM OF ARMS, VIENNA.—*Section across Hall and Staircase.*

had triumphed over all difficulties, and accomplished a success alike honourable to themselves and their country. Her Majesty had accordingly directed that Captain Anderson, Professor Thomson, Mr. Glass, and Mr. Canning, should be knighted; and that Mr. Lampson, deputy-chairman of the original company, and Mr. Gooch, M.P., should receive the honour of baronetcy. If Mr. Cyrus Field received no such mark of royal favour, it was because her Majesty did not wish to interfere with what might seem to be the natural functions of the Government of the country to which Mr. Field belonged, and which he had served equally with this country in the work which had been done. The chairman in continuation said that Lord Derby had wished to confer upon Captain Anderson some further mark more immediately connected with his own profession, but he had been greatly disappointed to find that neither the rules of the naval service nor the statute of the Order of the Bath allowed him to do so.

Mr. Elliott expressed great regret that Mr. Glass was seriously ill. He also said that they would next lay a cable direct to New York.

## THE MUSEUM OF ARMS IN THE ARSENAL, VIENNA.

We add to our illustrations of the new Museum of Arms in Vienna, the transverse section of hall and staircase, from the designs of Mr. Hansen. The elevation of this portion of the building, and representations of some of the internal columns and *antæ*, we have already given.* The statues around the columns represent eminent commanders.

* See pp. 706, 707, *ante*.

## THE WHITEHALL CLUB, PARLIAMENT-STREET, WESTMINSTER.

The building represented by the annexed engraving has been erected in Parliament-street, at the corner of Derby-street, Canon-row, for the use of the Whitehall Club. It is, as will be seen, Italian in style, and the exterior is wholly of stone. It was designed by the late Mr. Parnell, architect, and has been carried out by his son, Messrs. Lucas being the builders. The amount of the contract was 20,246*l.*; the total cost probably 5,000*l.* more. The sculpture was executed by Mr. Tolmie. The accommodation within provides a morning-room and coffee-room, each 40 ft. long.

The club, although it includes a number of civil engineers, contractors, and others, having occasional business in the Committee-rooms of the Houses of Parliament, is not restricted to any special class, and is non-political.

THE WHITEHALL CLUBHOUSE, PARLIAMENT STREET, WESTMINSTER.

## THE HOLBORN THEATRE ROYAL.

The new theatre, which has been built for Mr. Sefton Parry, is on the site of the old Post-office Stable-yard, and has the advantage of three distinct entrances—one from Holborn, one from Brownlow-street, and another from Jockeys'-fields. The pit is reached by a passage on a level with Brownlow-street, where also is the gallery entrance, while the access to the boxes is but a little above the level of Holborn, the stage entrance being from the rear in Jockeys'-fields.

Long before the walls of the building had attained the height of the enclosing wall, injunctions poured forth on all sides with reference to light and air. These proceedings, in some degree, delayed the building. After considerable difficulties in law proceedings, terms were ultimately arrived at, which restricted the building being carried up beyond a certain limit. These restrictions, to a great extent, precluded Mr. Parry carrying out his original intentions. The building is now of the following dimensions:—From foot-lights to the back of pit, 70 ft.; width of pit between walls, 52 ft.; from foot-lights to back of stage, 44 ft.; width of stage, 52 ft.; proscenium, 26 ft. by 23 ft.; the height from floor of pit to ceiling, 35 ft.

The internal arrangement of the theatre consists in four rows of stalls 3 ft. 6 in. from back to back; pit seats 2 ft. 10 in. from back to back. It was originally intended that the first tier should be devoted to the dress circle—in the manner of the Haymarket Theatre. The idea was afterwards modified by Mr. Parry, and four boxes were formed on either side—the dress circle, consisting of six rows of seats 3 ft. apart, facing the stage. The second tier has four slip boxes on either side, two rows of amphitheatre stalls, and at the back is a spacious gallery.

There are no proscenium boxes as in ordinary theatres, the space having been taken up by additional staircases.

The building is in the usual horse-shoe form. Of the accommodation afforded, and its fitness or otherwise for the purpose, we shall be better able to speak when we have seen it filled.

The style of decoration consists in bulged box front with projecting ornaments, and at intervals shields, containing allegorical figures; the ceiling is panelled out by projecting ribs, at the intersections of which are small pendants. The proscenium decorations consist in a dipha ground with circular ribs running round same; the tinted decorations are pale salmon, and white relieved with gold; the general effect is elegant and the colouring judiciously applied.

The building was carried out by Mr. Simpson; the composition works were executed by Messrs. Kettle & Balliscombe, of Marylebone-street; the tinted decorations by Mr. Honmann; the gas-fittings of the house and stage were entrusted to Mr. Jones, of Bow-street.

## IMPROVEMENTS IN BELFAST.

So busy were the local builders during the past summer that every carpenter, bricklayer, painter, and mason was engaged, until several new buildings had to be taken by contractors at a distance; principally in consequence of Belfast builders not being able to spare men for them, and partly in consequence of strikes for increase of wages—the trade generally being so prosperous that operatives who, ten years ago, were content with 18s. a week, and could hardly get work to do at the price, struck during the past twelve months for an advance on 35s., or double the wages of ten years ago. House accommodation, says the *Northern Whig*, in giving an account of the local improvements, is now scarcely to be had, except at comparatively enormous rents, and this while the increase of houses in Belfast during the last six years has been at the rate of 1,200 a year. Of these, five out of every six were houses for the working classes, generally two stories in height,—the remainder being splendid palatial warehouses, manufactories of various kinds, or country seats in suburban districts of the town within the municipal borough. The portions of the town in which building operations have, for the most part, extended, are the north and north-west sides, in every part of which additions have been made, principally in consequence of the many manufactories which have been erected on the Falls and Crumlin Roads. Many of these houses are not built as they ought to be, and are wanting in many of the necessaries of cleanliness, and even decency.

The buildings, other than dwelling-houses, going on in Belfast, or that have recently been finished, continues our authority, are very varied and numerous. The new Roman Catholic semi-cathedral on the Falls-road, is almost finished, and will be opened in about three weeks. The new Methodist College on the Lisburn-road is far advanced towards completion. A new Roman Catholic parochial school is almost completed in Barrack-street. One of four new Episcopal churches in Belfast is rapidly approaching completion; and the building of four new Presbyterian houses of worship will be entered upon immediately. Large warehouses for various purposes, are being erected.

In addition to all these and other public buildings, there are great public improvements going on. The new docks, at a cost (including recent proposed additions) of upwards of 200,000*l.*; the new waterworks, at a cost of about 130,000*l.*; the new cemetery, at a supposed cost of about 20,000*l.* The works of the Central Railway Company are also being rapidly proceeded with. A contract has been entered into for 10,000*l.* for the paving of a number of the new streets. A sewerage scheme has been proposed, which it is almost certain will be carried to completion, at a cost of at least 100,000*l.* The council have authorised the expenditure of 50,000*l.* on a Town Hall and public offices.

## GLASGOW.

A new hall has just been erected at the junction of Grove-street and Scotia-street, with its front towards City-road, for the use of the North-Western Working People's Institution, which may be described as a Christian brotherhood, banded together for spiritual and social improvement, chiefly through the instrumentality of a philanthropic gentleman, who devotes all his leisure to the cause, and has rallied round him a band of coadjutors. The edifice, in its several departments, accommodates upwards of 3,000 persons: the cost has been 5,000*l.* The style is Grecian, freely treated. The capitals of pilasters and other enrichments are all original designs. The motto of the institution, "Bear ye one another's burdens," appears on the pediment, within a carved wreath. In the interior, the ceiling and ends of the hall are elliptical; a gallery, of corresponding outline, with baluster-shaped front and open metal panelling, is supported on pillars having ornamental capitals of open foliated metal-work, and carved completely round the walls. The ceiling is formed into enriched panels, each having a large and effective centre flower, perforated for ventilation.

Mr. Alexander George Thomson, of Glasgow, is the architect; the superintendent of works, Mr. P. Ferguson; the mason, Mr. A. Fraser.

Mr. Thomson is at present engaged as civil engineer to the new slip-dock at the junction of the River Kelvin with the Clyde, Pointhouse, now constructing for Messrs. A. & J. Inglis, ship-builders. This dock is over 800 ft. long by 56 ft. in breadth, and is capable of accommodating vessels of 2,000 tons and upwards. Mr. Manuel is the contractor.

## HETHERSETT CHURCH, NORFOLK.

The chancel, or rather quasi-chancel of this church (for the original one disappeared some 300 years ago), was re-opened for service on the 14th ult. The east window is of Late Decorated work, and was taken out of the old chancel, probably about the year 1536. It has now been restored, and filled in with coloured glass (supplied by Messrs. Heaton & Butler), consisting of quarries in diaper with medallions of foliated pattern, the effect produced being good. In harmony with the tone and design of the window are the decorations in the splays and on the adjoining walls, consisting of a text with coloured borders above the new oak reredos, and carried round the edge of the window. Texts similarly ornamented are carried round each of the four arches of the chancel, crosses and other emblems being sparingly introduced in the spandrels. The two wings of the new reredos contain the usual four tablets, which are of delicately-coloured slate, the lettering, in bold Lombardic type, having the *unusual* advantage of easy reading by the humblest scholar in the village. The eight spandrels over the tablets are filled in with well-executed carved foliage, surmounted by trefoils with backgrounds of rich blue. The central part is more elaborate, containing the symbols of the four evangelists in alto-relievo, sparingly picked with gilding, and with a background of blue. Above the communion-table is diaper work with trefoils, the centre one filled in with a foliated cross of pollard oak on a blue ground. The oak-wood carving was executed by Mr. Daynes. A new altar-railing, supplied by Messrs. Hart, and Minton's tiles, complete the restoration of this part of the church. The works were executed by Mr. Cornish, builder, of North Walsham, under the direction of Mt. Augustus E. Browne, architect, of Lincoln's-Inn-Fields.

## RECORDS OF EMINENT LONDONERS.

"A Letter on Eminent Londoners and Civic Records, addressed to the Members of the Court of Common Council, by B. B. Orridge, one of the Members of the Ward of Cheap," has been printed for circulation. Mr. Orridge in May last made an unsuccessful endeavour to obtain a resolution of the court in favour of his views, and he now re-addresses them on the subject, pointing out, "That the library at Guildhall does not contain any record of the eminent men who have been connected with this city, neither does any such record exist elsewhere, and that the non-existence of such record is detrimental to the reputation of the Corporation of London;" also "That there are ample materials in the possession of the Corporation and elsewhere to assist the compilation of a civic biographical dictionary." With these facts before us, he adds, "I venture to ask whether you think it either right or politic to remain inactive in these matters; whether it is just to yourselves or to the intelligence of those we represent, or to the memory of those who have been before us? In our discussions we are often reminded by debators of the fame and influence of this great city. Is it right to forget the names and the deeds of those who made it famous and influential?" We will answer for the Common Council,—it is neither right nor wise.

## THE MIDDEN SYSTEM IN LIVERPOOL.

The *Liverpool Albion*, commenting on a letter in our last impression on the Condition of Liverpool, says,—The disgraceful condition of the town, described by "Civil Engineer," has been the cause of repeated remonstrance; but it is likely to continue until the inhabitants themselves awake to the great danger. The continuance of the cesspit system is urged on two grounds by those in authority, who oppose the general substitution of the water-closet. Not a few contend that the open midden is not injurious to health. Even Dr. Shearer, whose evidence is so important in other respects, says, "Mere stinks, as far as we (the faculty) know, do not produce any specific disease;" "but," he adds, "we are not quite sure whether they produce disease. We believe they are not healthy; that to breathe them constantly would be prejudicial to health; but that they produce fever no one would venture to say, unless it be with regard to typhoid fever, and that is not properly proved." Owners and agents of cottage property assert that the midden is preferable to the water-closet, and this class of the community are not without their representatives in the council, who roundly declare that the cottages, with the closely-adjoining open middens, are more healthy than the houses which are supplied with closets. This order of intelligence is on a level with that of the witness in the recent Leeds pig-nuisance information, who stated that he preferred to live near the offending pigsty, and that, indeed, he had enjoyed better health since he had done so. If these fermenting cesspools be not prejudicial to the public health, if the emptying of them do not create a public nuisance, what ground had the Health Committee for proceeding against Mr. Ellison, the contractor for the removal of night-soil, for permitting the carts used in this process to remain in the yard, Soho-street, in such a condition as to be a nuisance? If the carts be a nuisance—and they are no doubt an intolerable nuisance—packed away together in a thickly-populated district like that of Soho—

how "all-pervading" must be "the horrible stench" when the nightmen are at their sickening work, or when the accumulations of refuse in the cesspits become putrid, and the offensive gases which are given off poison the entire atmosphere. Who can doubt that this is one of the many causes—some of them peculiar to Liverpool and to the readiness with which many of the miserable, fever-stricken, poor population of Ireland immigrate into Liverpool and find their way into our overcrowded districts—of our excessive, and, to the whole country, startling mortality. The remedy pointed out by "Civil Engineer," long ago suggested by common-sense, and now proved by the experience of London, requires, however, an unfailing command of water, and that cannot be permanently ensured until some further addition is made to our means of supply.

The *Times*, we may add, also brings the subject under the notice of its readers in the form of quotations from the *Builder* in an article extracted from the *Pall-mall Gazette;* and we are glad to observe that the Home Secretary has sent Mr. Taylor to report as to the necessity of a new Government inquiry into the sanitary condition of this borough.

## TESTING STOVES AND LIGHTS: PARIS EXHIBITION.

We are glad to hear that a building will be erected in the grounds of the Paris Exhibition of 1867, for the purposes of testing various kinds of stoves, cooking apparatus, and modes of lighting; which building will be so designed as to afford the opportunity of exhibiting in use, metal vanes, ornamental bricks for chimneys, fastenings and furniture; pavements, lamps, and cottage furniture. We hope manufacturers will take advantage of the arrangement.

This testing of stoves was urged by a committee on the managers of the London 1862 Exhibition, but could not be brought about.

## THE SEWAGE OF BIRMINGHAM.

A report upon the best method of dealing with the sewage of Birmingham, in order to turn it to useful account and to prevent the pollution of the river Tame, has been prepared by the local Public Works Committee for presentation to the Town Council. The committee, says the local *Journal*, have for a long time past been engaged in extensive and laborious inquiries into the systems adopted in various places with the view of utilizing town sewage; and they have finally decided to recommend the application of the plan which has been found so efficacious at Croydon,—that is, the deposition of the sewage matter upon the land, and the cultivation of crops of Italian rye-grass. For the purpose of experiment, on a scale sufficiently large to afford a fair trial of the sytem, the committee will recommend the council to acquire a quantity of land in the valley of the Tame, under the powers conferred by the Sewage Utilization Act of last session.

## THE TRADES MOVEMENT.

*London.*—An aggregate meeting of society and non-society operative house painters and decorators was held on Wednesday, at Cleveland Hall, Fitzroy-square, Mr. Ward in the chair, for the purpose of inaugurating a movement for obtaining an advance of wages to 8d. per hour in March next. Ultimately it was agreed that twelve members should be appointed from each organization, who should meet and prepare a plan of united action, and submit the same to an adjourned meeting for carrying out the 8d. advance at the time stated.——A meeting of the brass finishers and gasfitters of London and its suburbs was held on Tuesday in last week, for the purpose of considering the best means of obtaining an advance of wages, and a reduction of the hours of labour.

*Nottingham.*—At a meeting of the master builders to discuss matters connected with the bricklayers' and labourers' strike, it has been unanimously resolved to adjourn the meeting for one month, "to give the operatives time to reflect upon the steps they have taken."

*Huddersfield.*—A meeting of the joiners of Huddersfield was recently held, and after some discussion it was decided to give their employers six months' notice of a demand for an advance of 3s. a week in their wages.

*Glasgow.*—It is understood that, at a meeting of the Greenock carpenters, it has been resolved by a considerable majority to resume work on the masters' terms. In this way the only obstacle to a settlement between the Glasgow carpenters and the Masters' Association is removed, and the strike may probably be considered at an end.

## THE CHURCH TOWERS OF IPSWICH.

Every visitor to Ipswich is struck with the lofty tower and spire of St. Mary's, just now completed from the design of Mr. Phipson, architect. It has led to much discussion as to the height of other towers in the town, and Mr. Phipson writes as follows:—

Having recently had the whole of them very carefully measured, I am enabled to do this with great accuracy.

I should explain that the height in each instance is from the ground to the top of the battlements or parapet, and the square of the tower is measured *exclusive* of projecting buttresses.

| | Height. ft. | in. | | Square. ft. | in. |
|---|---|---|---|---|---|
| St. Mary's Tower (tower) ... | 93 | 10 | ..... | 24 | 6 |
| Spire to top of vane ..... | 82 | 3 | | | |
| Total ..... | 176 | 1 | | | |
| St. Peter ..... | 93 | 6 | ..... | 24 | 0 |
| St. Lawrance ..... | 92 | 3 | ..... | 21 | 7½ |
| St. Clement ..... | 76 | 6 | ..... | 16 | 6 |
| St. Mary Quay ..... | 73 | 0 | ..... | 19 | 0 |
| St. Margaret ..... | 66 | 9 | ..... | 20 | 6 |
| St. Stephen ..... | 59 | 6 | ..... | 16 | 6 |
| St. Nicholas ..... | 57 | 2 | ..... | 17 | 2 |
| St. Matthew ..... | 53 | 9 | ..... | 19 | 6 |
| St. Mary Elms ..... | 53 | 6 | ..... | 18 | 6 |
| St. Mary Stoke ..... | 50 | 0 | ..... | 18 | 4 |
| St. Helen ..... | 44 | 3 | ..... | 15 | 6 |

The weight of St. Mary's tower and spire, when completed, and the twelve-bell peal hung, will be as near as possible 2,683 tons; and as the footings or foundations are 1,042 ft. in superficial area, it follows that each square foot of the natural soil upon which the tower stands has to bear a weight of a little more than 2½ tons, or about 23 tons to every square yard. With such a pressure it is a satisfaction to be able to say that not the slightest approach to a settlement has taken place in any part of the work."

## ACCIDENTS.

One of the labourers employed at the Thames Embankment, by some incautious movement, overbalanced himself and fell from the scaffolding, 31 ft. high. On his removal to Charing-cross Hospital it was found that he had sustained a fracture of the skull, and that his ribs and collar-bone were broken.

A stand on Walsall racecourse has fallen. The transverse bars supporting the spectators' gallery above the refreshment bar would seem to have been bolted to and strengthened by upright beams at the ends and in the centre, with the exception of the middle two, to which no central supports were affixed. Some of the occupants of the stand happened to congregate together just over one of the unpropped transverse beams, which, after a premonitory creak, gave way, and precipitated some fifteen or twenty persons into the refreshment bar below. Most, if not all, the precipitated spectators, and some of the persons in charge of the refreshment-stall, were more or less hurt, but none of their injuries were of a character likely to lead to fatal results.

West Hartlepool Dock Entrance has given way. Some months ago the dock gates at the entrance from the West Hartlepool harbour to the coal dock got out of order, and had to be removed for repair. It was necessary to dam the water, and a barrier was erected. The gates were repaired a week or two ago, and lodged in their places, but the "ways" on which they traversed required renewing, and to accomplish this it was requisite that the entrance-lock should be free from water. As a construction similar to the dam was expensive, it was considered that the "booms," which are used during stormy weather to protect the gates from the force of the sea, with beams of timber placed down the niches in the quay, about 3 ft. or 4 ft. distant, would afford sufficient resistance to water. They were put down, bolted, and plated, and the place between filled with clay, as a precaution against danger. When the gates gave way, the water at one side was about 20 ft. above them, and on the seaward side the tide had risen to 17 ft. The sea burst upon the dam with a report resembling that of a piece of ordnance, and rushed in like a deluge. Ropes and life-buoys were thrown down amongst the men, who were struggling for their lives. Some of them caught hold of chains and portions of the gearing used for moving the gates, and others were washed against the dam, and seized the nearest projection: all escaped.

The roof of a large saw-mill, recently erected at Hull, fell in last week. The proprietor, Mr. Neale, and another man, were dangerously injured.

The bridge across the new railway at Tow Law, near Bishop Auckland, has fallen. The fortunate circumstance of the workmen observing the dangerous position of the bridge prevented any fatal occurrence.

## THE METROPOLITAN BOARD OF WORKS.

PROGRESS OF THE THAMES EMBANKMENT.

The Chairman, at the first meeting after adjournment, said, that during the recess arrangements had been made between Messrs. Brassey and Mr. Furness, the contractor, and Mr. Bazalgette, the engineer, had reported upon the matter.

Mr. Bazalgette then read his report, part of which we may quote:—

"North Side of the River.—Contract No. 1, between Westminster and Waterloo Bridges.—In the greater part of the interval between July and the 6th instant, the works may be said to have been partially suspended. For some time prior to the adjournment of the Board on the 10th ult., and for a considerable time after, negotiations were taking place with Mr. Brassey with reference to his pinning in the completion of the works under this contract. These negotiations having been at last successful, Mr. Brassey entered upon actual operations, and on the 6th instant the works may be said to have practically recommenced from that date. Since then the following supplies have been delivered on the works—14,500 bushels of Portland cement, 10,500 cubic feet of granite, 450,000 bricks; and other cargoes are, I am informed, on the way."

"Contract No. 2.—Between Waterloo Bridge and Temple Gardens.—Since the date of my last report the works under this contract have made fair progress. The length of cofferdam already removed is 800 ft., and a further length of 1,110 ft. is in course of removal, and which when effected will expose to view 1,910 ft. of the wall, including the Temple pier. The approximate value of the whole of the completed works and of the materials and plant upon the ground is 197,880*l.*, of which 6,512*l.* represent the progress in the past two months. The total approximate value of the whole of the completed work is 67,000*l.*, of which 17,000*l.* represent the progress made by Mr. Webster within the past two months."

The report was received and adopted.

Mr. Bazalgette stated to the Board that there had been great delay in connexion with the Pneumatic Railway.

The Chairman explained that the Board had no power to compel them to expedite the work.

## AN ARTESIAN WELL.

The proprietor of the Kingston Brewery being desirous of obtaining a pure supply of water has recently had an artesian well sunk on his premises in Brook-street. At Southampton the boring was carried on till a depth of 1,317 ft. had been reached, but without getting a valuable supply of water. An attempt was afterwards made at Highgate, on the strength of geological theories, but it proved a failure, and geologists were forced to acknowledge that while their theoretical reasoning with respect to subterranean strata could present a certainty in saying what *would not* be found in any given place, it could not afford a guarantee of what *would be* found. It will thus be seen that to a certain extent the sinking of an artesian well, if not actually groping in the dark, is not unlike it, for after all the boring, it may be either that no water can be got, or in such a small quantity that it is almost useless. Of the well at Kingston, the *Surrey Comet* says,—it was commenced early in last November; the engineers being Messrs. Easton, Amos, & Son; the well-sinker being Mr. Tilley, of Cheapside. The first operation was to sink a shaft 6 ft. 6 in. in diameter, which was carried to a depth of 90 ft., and lined with 9-inch brickwork, set in cement. The top of the shaft, to the depth of 18 ft., was lined with iron cylinders to keep out the surface water, which would otherwise in time have percolated through. The shaft being completed, cast-iron pipes were erected from the base, to some height up, and there

a platform was erected. The work of boring was then commenced.

The pipes first used were 7-inch, and were sunk to a depth of 325 ft., when 4-inch were put down till chalk was reached; after sinking 40 ft. in that, the boring was proceeded with, but no pipes were used. This was in order that no springs might be shut out from contributing towards the supply. Directly the vein was tapped, water rose like a fountain 8 ft. above the surface. For the first 200 ft., when passing through soft soil, the pipes sank by their own weight as the earth was removed from under them; but, as the depth became greater, the pressure of the earth upon them became such that great pressure had to be exerted to force the tubes down. For that purpose the stageing down the shaft was used; on it was placed an hydraulic press, and a weight of ten tons had at last to be brought to bear before the pipes could be induced to descend, When the pump is not at work, from eighteen to twenty gallons flow away every minute. The steam-pump used at the brewery has three throws, and raises about seventy gallons per minute. To keep the whole establishment supplied with water, or, as called in a brewery, "liquor," this pump raises on an average 25,200 gallons daily, but yet for all that, and when at its greatest speed, the water in the reservoir—90 ft. deep and 5 ft. in diameter—is only reduced and kept down rather more than a foot. The quantity of water which flows every day will be 25,200 gallons added to that which runs away—eighteen gallons a minute for eighteen hours—equal to 19,440 gallons daily. The yield of the well may thus be estimated at 44,640 gallons each working day, a total of 293,760 in a week. The overflow—nearly 20,000 gallons daily,—is turned into the sewer, thereby flushing it considerably.

The strata through which the boring was carried, with their respective depths, are shown below:—

| Kinds of Soil. | Depth. Ft. | In. |
|---|---|---|
| Loamy Clay | 11 | 0 |
| Gravel | 2 | 0 |
| Blue Clay | 245 | 0 |
| Coloured Clays | 57 | 0 |
| Marl | 4 | 0 |
| Loamy Sand | 0 | 5 |
| Marl | 9 | 0 |
| Loamy Sand | 0 | 9 |
| Marl | 5 | 0 |
| Dark Sand | 12 | 0 |
| Light-brown Sand | 25 | 0 |
| Chalk and Flints | 99 | 0 |
| Total depth | 470 | 2 |

## CHURCH BELLS.

Sir,—The deep and rich tones of the magnificent bells that call the people to church in Belgium, France, and Germany, are truly welcome to the ear. To say nothing of the melodious cylinder chimes, or of the pleasing effect produced by an occasional performance on the *carillons à clavier*. Very delightful, too, is the music that issues from many an old church tower in our own "ringing island." Englishmen love it well, and have often cause to exclaim,

"How sweet the tuneful bells' responsive peal!"

But, the "ting-tangs" and single bells, at too many of our modern churches, especially in this metropolis, give out noises so inappropriate and offensive, that they ought never to be used, except as alarm-bells in case of fire. I complain not that here and there a church has only one or two bells, for costly peals are not desirable at comparatively small district churches—though every large tower ought to possess one,—but I censure the quality of the bells. And having devoted much time and attention to the subject, I do not hesitate to say that the wretched things in question are a disgrace to the sacred edifices to which they severally belong.

Let no one suppose, however, that the art of bell-founding has ever been lost in Great Britain, or that I wish to depreciate the ability of any living founder. At the present moment there are well-known foundries at work, from which many good bells have been sent out from time to time, including peals that deserve honourable mention. And certain it is that we shall never want model-bells, so long as the glorious peal—of ten—exists at the church of St. Mary-le-Bow, Cheapside; or the equally fine one—of twelve—can be found in the tower of St. Peter Mancroft, Norwich. If, therefore, people will only agree to pay fair prices, they may, I trust, still obtain fine-toned bells in England, as well as fine-toned organs. Moreover, the evils of which I have complained can easily be remedied.

A word on the use and abuse of church bells, concerning which I fought earnestly, and not altogether in vain, some years ago. Now, most persons know that our bells are used for various public and social purposes. To quote from an old inscription, they "Praise God, call the people, grace festivals, and mourn the dead." They rejoice with the joyful, and grieve with the sorrowful. The loudest and most joyous portion of bell music is produced by *ringing* in peal. And here I would observe that "scientific change ringing," as now practised by our "College Youths," and other societies, is "as fine an exercise for the body, as it is a serviceable one for the mind." It is, therefore, well calculated to unite men of various grades in society, who may join in it as heartily as in the manly game of cricket, or certain other of the scientific exercises practised in this country.

But the chief use of church bells is, or ought to be, to call the congregation to the house of prayer. For this purpose they should be *chimed*, and with precision; not by machinery, nor by any apparatus or contrivance other than the ordinary gear, but in the legitimate way by hand. Soft and melodious music,

"Clear and sonorous as the gale comes on,

is thus elicited from a fine peal of bells. In such a case, well may it be said that "no music can be more soothing, or affect the feelings so strongly, by old associations, as the sounds from the old church tower."

Notwithstanding all that has been said and sung, however, in praise of our "Cheerful Sabbath Bells," it is to be feared that among the thousands of peals in the United Kingdom, very few indeed are now chimed as they ought to be. In some towers, I know that peals of five, six, and eight bells are uniformly chimed in an excellent manner; but in numerous others there is neither ringing nor chiming, properly so called, but a *wild jangling* is kept up, producing an offensive "*clatter and clang*."

In conclusion, then, permit me to add the following statement:—Any person, being able and willing, can learn to chime in the legitimate way, by hand, in a very few days. I therefore maintain that wherever a church tower containing a peal exists, no reasonable excuse can possibly be made for not chiming the bells for divine service on Sundays, in the manner indicated,—that is, "decently and in order," so that the effect produced may satisfy the musical ear.

Thomas Walesby.

*Golden-square.*

## FLITCH GIRDERS.

An unfortunate omission by the author occurred in working out the strain upon the iron plate in the article on "Flitch Girders," at p. 703. The result of the addition of the moments $\frac{fsd^2}{3}$ and $\frac{fsd'^2}{3}$ should have been $\frac{1}{6}\ fsD^2$ instead of $\frac{2}{3}\ fsD^2$, and consequently the value of W should have been 1·63 tons, instead of 6·54 tons.

## SEWER VENTILATION IN WHITEHAVEN.

Sir,—Through the columns of your universally spread paper, I beg to draw your attention, and that of your numerous class of professional readers, to the system of sewerage ventilation about to be carried out at Whitehaven, in Cumberland.

At intervals along the streets and lanes are erected iron ventilators, communicating at once with the sewage in the pipes, no trap or airtight cover of any description. The main outlet sewer is a tunnel some three-quarters of a mile in length, about the level of low water-mark at both ends, consequently nearly level. It is proposed to erect an engine adjoining the harbour, in one of the busiest parts of the town, to pump the accumulated sewage into the said harbour during the time the main sewer is backed up by the tide at high water.

About seventeen years ago, this place effectually withstood the recommendation of Mr. R. Rawlinson, the sanitary superintendent, to have the town placed under the Health Act of 1848.

About four years ago the town was visited with a dire endemic, causing great mortality, attributed at the time to bad drains, pig-sties, filthy yards, &c. The present movement for general sewerage may, I suppose, be attributed to the above endemic.

The question is,—Is the present system of sewerage ventilation now being done likely to better the health of the town? Is it a proper system?

I am sure your opinion, or that of any of your professional readers, would greatly oblige many parties in this county. It were a pity that this place should be quoted as a precedent for other seaports similarly circumstanced, and where the sanitary measures have not yet been commenced.

Beta.

## THE MANAGEMENT OF THE PATENT OFFICE.

Sir,—In your number for the 8th September an article under the above title appeared, giving an account of the last report of the Commissioners of Patents. In the concluding paragraph of this article you express gratitude for what the Patent Office has done, and in that expression those who know most about the subject will, I think, be most ready to join with you. I cannot, however, avoid feeling that as "an epitome of the Commissioners' proceedings since their establishment," your article in one or two particulars understates what has been effected, and I beg leave, with your permission, to endeavour to add to the information it conveys.

The Commissioners of Patents have for years past consistently and energetically pursued the policy of diffusing information connected with inventions, and especially with patented inventions, as widely and as freely as possible. In this policy they have been most ably seconded by their energetic officer, Professor Bennett Woodcroft, the superintendent of specifications, whose name you mention more than once, and to whom all inventors owe a debt of gratitude.

Previous to 1852 there was no clue whatever to the contents of the patents already taken out, and information was literally not obtainable, except by chance or through litigation. The original documents lay in several different repositories, where they could, it is true, be consulted; but it was only accident, or the good information of his patent agent, which secured any intending inventor from the mortification and loss of finding, when too late, that his invention had been anticipated.

The first step taken was the preparation by Professor Woodcroft, of a series of complete indices of all then existing patents, from the reign of James I. down to 1852. This was done very systematically and completely, in the form of (1) a chronological index, giving the patents in the order in which they were granted; (2) an alphabetical index under patentees' names; (3) a subject-matter index, giving the objects of the specifications, alphabetically arranged, collected into groups of allied subjects, and so tabulated as to facilitate references as much as possible; (4) a reference index, pointing out where the original specification could be consulted, and what publications had noticed or described the invention to which it referred. The three first indices, but not the reference index, are continued in annual volumes to the present day.

This was a great step; it at once rendered the identification of any patent on any subject possible and even easy, but still the document itself could be consulted only in the manuscript original, and at the place of enrolment. To place the specifications themselves within the reach of all those desiring or requiring to make use of them, it was determined to print and publish them; and not only was this done with new patents, but by degrees the same was done for all back patents. To render these as available as possible, not only were they sold at low prices, but the Commissioners have presented the entire series of their publications to any public library willing to make them accessible free, daily, to all applicants: such series include the patents themselves, indices, abstracts, and various other publications. Your figures prove that the printing has been a great undertaking, but its value fully justifies the outlay.

The abstracts of specifications are somewhat fully referred to by you, and therefore I need not dwell upon them. They are intended to serve the same purpose as an index and a file of patents combined, so as to inform the searcher after

nformation on any point exactly where he may find that point described in the specification of any patent applied for or granted.

The Commissioners have published other works of value besides those named. The most important is their "Journal," which has appeared twice a week since 1854. It contains lists and short descriptions of all patents as they are applied for or granted, or cancelled, or extended, as the case may be, together with other information of a character to be useful to inventors.

Your article refers to the library. It has been most disgracefully ill-housed, and the staff of librarians has not been numerous enough, though very competent, for the work. But the fact remains that it was the first library, and still, I believe, remains the only scientific library (with the exception of the Map-room of the Geographical Society) open free daily without any card, or introduction, or other credentials of admission, beyond the capacity to write one's name in a book, being needed. There is the nucleus of a most excellent collection of books, and the library is extensively made use of, considering the cramped space it occupies.

The museum is, as you observe, so crowded in its present location at South Kensington that half the objects can barely be seen, but its contents are most valuable, and probably there is no spot where so many objects of interest to those whose studies or occupations relate to mechanical invention, and the history of our wonderful progress, can be seen as here.

A complete building for a Patent Office, Museum, and Library, in a central situation is urgently needed and quite as essential is the adoption of your suggestions for the increase of the staff and the appointment of a head officer, who should efficiently fill the office of Clerk to the Commissioners, which is now vacant, and which it is now notorious has not been usefully filled of late. I do not so heartily agree with your recommendation of increased scrutiny before the granting of patents, but that is rather a matter of opinion on the working of the patent laws than of facts, and it is to some questions of actual fact that I have desired to confine myself in this letter. S.

## A POST-MORTAR INQUIRY.

Sir,—Is not the modern compound termed *mortar* a mockery and delusion? I noted, recently, the demolition of a newly-built house; the *housebreakers* had an easy job; it was only dry dust and bricks, there was no cohesive difficulty, their anxiety seemed to consist in preventing it from coming down with *a run*. We all know the fate of the house built upon the sands. Why, half of the suburban residences are in the like predicament, and hopelessly *cracked*. I do not mean that they are demented, but they certainly are not cemented. How deplorable to see new houses propped up and middle-aged ones on crutches. How ludicrous to see weakly erections making a bow or curtsey as soon as they are asked to stand firm—"How are their poor feet?"—and let the public admire their facings, for they are to be sold. I remember living in a very nervous house, which trembled and shook when a vehicle passed. I am confident the shivering was contagious, for we all had it, especially the crockery; the windows had perpetual shivers, and a blue aguish mould formed on nearly everything in cupboards. I deemed it prudent to flit from the old house in its teens. Why not license them for a period? or, if unfit, condemn them before they collapse? We might then hope to live in secure and comfortable domiciles instead of the present card castles and colanders. R. T.

## "VITALIZING AIR."

The "reflective writer in the *John Bull*," whom you quote (p. 714), as suggesting the application of Mr. Graham's discovery to the ventilation of rooms, has evidently not made himself acquainted with the real nature of the discovery referred to. In No. 86 of the "Proceedings of the Royal Society," an abstract of Mr. Graham's paper is given, from which it appears that "a thin film of caoutchouc has no porosity, and is really impervious to air *as gas*; but the same film is capable of liquefying the individual gases of which air is composed, while oxygen and nitrogen, in the liquid form, are capable of penetrating the substance of the membrane, and may again evaporate into a *vacuum* and appear as gases." The gases being unequally absorbed and condensed, oxygen passes through more readily than nitrogen. "The septum keeps back one half of the nitrogen, and allows the other half to pass through with all the oxygen."

He then goes on to describe the manner of performing the experiment. "One side of the rubber-film must be freely exposed to the atmosphere, and the other side be under the *influence of a vacuum* at the same time." The fact is, the air has to be *forced* through the india-rubber by a pressure of 15 lb. to the square inch,—a condition which at once prevents the discovery from being of use in the way the writer above referred to proposes. E. Wyndham Tarn.

## QUANTITIES AND TENDERS.

Sir,—As the successful competitor for the works at Plaistow for the London Wharfing and Warehousing Company, I beg to say that my tender was not based upon the quantities as stated to have been supplied in your number of the 15th ult., but I employed my own surveyor, upon whose estimate my amount was founded.

J. Harris.

*** The question of quantities and "quantity-surveyors" is becoming a serious one: we shall have something to say about it before long.—Ed.

## THE INCOME OF THE WORKING CLASSES.

Mr. Leone Levi has been making a fresh estimate or series of estimates of the income of the working classes in the United Kingdom. He includes all who are employed in manual labour, and brings the total to 418,000,000*l*. The number of workers he computes to be, in England, 7,466,000; in Scotland, 1,104,000; and in Ireland, 2,127,000: total, 10,697,000.*

The wages, details of which are given in connexion with each branch of industry, seem to amount to the following general averages:—

| Ages. | England. | Scotland. | Ireland. |
|---|---|---|---|
| | s. d. | s. d. | s. d. |
| Males, 20 to 60 | 23 6 | 20 6 | 14 4 |
| ,, under 20 | 6 6 | 7 8 | 6 3 |
| Females, 20 to 60 | 12 6 | 10 6 | 9 9 |
| ,, under 20 | 8 6 | 8 2 | 7 4 |
| | 16 2 | 14 10 | 11 9 |

And the total earnings he puts as follows:—

| Ages. | England. | Scotland. | Ireland. | United Kingdom. |
|---|---|---|---|---|
| | £ | £ | £ | £ |
| Males, 20 to 60 | 217,300,000 | 29,000,000 | 43,500,000 | 289,800,000 |
| Ditto, under 20 | 15,900,000 | 2,400,000 | 4,000,000 | 22,300,000 |
| Females, 20 to 60 | 59,500,000 | 8,950,000 | 13,000,000 | 81,450,000 |
| Ditto, under 20 | 18,800,000 | 2,350,000 | 3,600,000 | 24,750,000 |
| | 311,500,000 | 42,700,000 | 64,100,000 | 418,300,000 |

The distribution of the total earning, according to industries, he estimates as follows:—

| | England. | Scotland. | Ireland. | United Kingdom. |
|---|---|---|---|---|
| | £ | £ | £ | £ |
| Agriculture | 44,000,000 | 8,000,000 | 23,000,000 | 75,000,000 |
| Textile Fabrics | 33,000,000 | 6,000,000 | 8,000,000 | 47,000,000 |
| Metal Manufactures | 27,000,000 | 3,000,000 | 1,500,000 | 31,500,000 |
| Building Trades | 35,000,000 | 4,000,000 | 3,500,000 | 42,500,000 |
| Shipping, Railways | 25,000,000 | 1,500,000 | 1,200,000 | 27,700,000 |
| Articles of Dress | 21,000,000 | 5,000,000 | 7,000,000 | 33,000,000 |
| Mining | 13,000,000 | 2,000,000 | —— | 15,000,000 |
| Domestic Service | 47,000,000 | 5,000,000 | 8,000,000 | 60,000,000 |
| Labourers, indefinite | 17,000,000 | 2,000,000 | 7,000,000 | 26,000,000 |
| Others | 49,500,000 | 6,200,000 | 4,900,000 | 60,600,000 |
| | 311,500,000 | 42,700,000 | 64,100,000 | 418,300,000† |

From these estimates it appears that the average income of a working man is, in England, 22s. 6d.; in Scotland, 20s. 6d.; and in Ireland, 14s. 4d. per week. Frequently, however, there are more workers than one in a family. In a family of five, generally two, or even three, persons are earning something. Assuming, then, that there are two earners in each family, and taking the average wages of men, women, and children as a basis, the average income per family may be estimated at 32s. 4d. in England, 29s. 6d. in Scotland, and 23s. 6d. in Ireland. These, says Mr. Levi, are the general results I come to. At best it is an estimate; but it is carefully calculated, and will be found as near the truth as the nature of such an inquiry admits of. I should add to the earnings by wages the income of the working classes from savings-banks, a considerable portion of the 38,400,000*l*. deposited belonging to them; from friendly societies, building societies, freehold houses and gardens, co-operative societies, benefit clubs, sick and burial clubs, &c.

* The estimated population in England and Wales, in the middle of 1861, was 20,119,496, and in 1865, 20,990,946. Increase in four years, 4·33 per cent.

† The annual amount of property and income charged with income-tax being incomes of 100*l*. and upwards, was in the year ended the 5th of April, 1864,—England, 276,514,250*l*.; Scotland, 27,137,918*l*.; Ireland, 23,123,333*l*.; United Kingdom, 326,775,501*l*. Assuming that a very small proportion, if any, of the income of the working classes is charged with income-tax, the total income of the United Kingdom thus ascertained would be—

| | Earned by Working Classes. | Assessed to Income-tax. | Total. |
|---|---|---|---|
| | £ | £ | £ |
| England | 311,500,000 | 276,500,000 | 588,000,000 |
| Scotland | 42,700,000 | 27,100,000 | 69,800,000 |
| Ireland | 64,100,000 | 23,100,000 | 87,200,000 |
| U. Kingdom | 418,000,000 | 326,700,000 | 745,000,000 |

## LAYING BRICKS PER THOUSAND.

At the Horsham County Court, in the case Miller v. Greenfield, plaintiff claimed 1*l*. 4s. 4d. for labour. Plaintiff stated that he engaged with defendant to lay bricks at 9s. per 1,000. During the time the work was going on there was some extra work, such as putting in sills, &c., and he sent to defendant to send a man to do it; and as he did not send any one, he left the job. Defendant said the plaintiff went on with his work very well so long as it was what was termed straight work, but when he came to the chimneys and he could not earn so much as he had been earning, he left the job, although he took it to do throughout. Plaintiff said he undertook to lay bricks at 9s. per 1,000, and of course he could leave off at any time. The judge, addressing him, said, Of course you could not; and it is very evident you acted upon your own wrong impression, and I must find verdict for the defendant.

## CHURCH-BUILDING NEWS.

*Pontefract.*—The foundation stone of a new church at Castleford, to take the place of the present All Saints' Church, which is an old cruciform structure, has been laid by the lord of the manor. The plans for the new building, the site of which is immediately behind the old church, have been prepared by Mr. Sheppard, architect, Leeds and Matlock. The style of architecture adopted is that of the fourteenth century, so as to preserve a uniformity with the northern part of the old church, which will be retained. The present tower will be also kept intact, but elevated some 25 ft. Accommodation will be provided for upwards of 600 sitters, the pews being open, the pulpit of stone, and the chancel fittings of oak. The total cost is estimated at 3,000*l*., of which sum 2,000*l*. have already been subscribed. Messrs. E. Latham & Sons, of Wakefield, are the contractors for the mason work of the building; and Mr. Wilson, Pontefract, for the plumbing and glazing.

*Coddington.*—The church here has been re-opened. The whole edifice has undergone a restoration, at the expense of Miss Hope, of Bosbury. Mr. F. R. Kempson, of Hereford, was the architect, and the contractors were Messrs. Collins & Cullis, of Tewkesbury. The organ chamber on the north side, the entrance porch on the south, and the roof of the chancel and nave are new. The church has been re-seated with open oak sittings, the floor laid with Godwin's encaustic tiles, and the pulpit removed

from the north to the south side of the church. The gallery at the west end has disappeared, and now the tower is open to the body of the church. In making excavations the remains of a Saxon structure were discovered; but there is proof enough to show that the present building was erected in the twelfth century.

*Burnley.*—The foundation-stone of St. Andrew's Church, Burnley, has been laid. The spot fixed upon adjoins the new schools which have been erected on the Colne-road. The architect is Mr. J. S. Medland Taylor, Manchester; and the contractors are Messrs. P. & J. Parker and G. Astwood, of Burnley. The church, which is being built entirely of stone, will seat about 600 persons, and will cost about 2,950*l.*

*Jarrow.*—The church has been re-opened for divine service. The restorative work has been carried out in accordance with the recommendations of Mr. G. G. Scott. The chancel and tower have been restored, and the nave built anew and enlarged after the fashion of its former architectural features. Formerly it afforded accommodation for only 300 persons, but more than twice that number will now find sittings. The furnishings of the chancel have been given by Lady James. The east window, representing "The Death of Bede," is the gift of Mrs. Aylmer, a relation of Lady James: the family of the late Dr. Dickinson have erected a window to his memory: a memorial window of the late Mrs. Thompson has been contributed by her husband; and Mrs. Philp has erected a window in memory of Mr. and Mrs. Dunsford; all of these windows having been the workmanship of Mr. Wailes, of Newcastle. The reading-desk, of carved oak, has been subscribed for by the Sunday-school teachers and pupils; a lady has contributed the lectern; and the Rev. T. H. Chester has given the pulpit, the base of which is of Weardale marble, the upper part being cane-stained, supported by serpentine pillars.

*Harton.*—The foundation-stone of a new church has been laid in the village of Harton, near South Shields. The edifice, which is dedicated to St. Peter, will be built of stone, from designs furnished by Mr. Hodgson Fowler, architect, Durham. It will consist of a nave, 21 ft. 6 in. by 54 ft.; a chancel, 18 ft. by 28 ft.; with vestry accommodation. The organ chamber will be on the north side. The nave will be lighted by two-light windows, with large circles above them. At the west end of the building will be two-light lancets, with similar circles over them. The east window will be a triplet under an arch. The chancel will be separated from the nave by an arch supported by carved capitals. The church will be fitted with sittings for 221 persons, and will be in the French Gothic style of architecture; the cost being about 1,600*l.* Mr. Hudspeth, of Alnwick and Jarrow, is the contractor.

*Gloucester.*—A parish meeting to decide on the plans for the proposed church of St. Catherine has been held. The plans were discussed, and it seemed to be the unanimous opinion that those of Messrs. Medland, Maberly, & Medland, were the best. But it was feared that they provided for too costly a building, and the meeting was adjourned for a month, that it may be seen whether enough subscriptions come in to enable the proposed tower and spire to be built, or whether it will be necessary to cut off these and other extras provided for in the present plans.

*Penarth* (*Wales*).—The new church of Penarth has been consecrated. It has been built upon the site of the old one, and is designed in the Early English style, somewhat freely treated. It consists of north and south aisles, nave, chancel, and two transepts, with a tower 90 ft. high, at the south-west angle of the edifice. At the north-east angle is a vestry, underneath which is an apparatus for heating water with which to warm the building. The roofs are covered with red Staffordshire tiles, and the tower, which contains a peal of six bells, by Mr. Taylor, of Loughborough, has a saddle-back roof, in imitation of the old church. The nave is 87 ft. long, and the chancel 37 ft., both internal measurement. The width of the nave and aisles is 51 ft. The fabric is built of Leckwith limestone, with Bath stone dressings. The present number of seats is 700, but there will be accommodation for nearly 100 more. The pillars which form the nave are of red and white stone, in alternate bands. Between the arches are eight panels, in each of which will be painted a Beatitude; two are already executed. Red and white bricks are used in the facings of the walls. The east window is a representation of the Ascension of our Lord, by Mr. Gibbs, of London. The organ, which is being made by Mr. Walker, of London, will be placed in the north transept. The seats are open, and made of stained wood, and the roof is of open timber. Gas has been introduced. The architect is Mr. William Butterfield, of London. The builders were Messrs. Webb, of Birmingham.

*Reading.*—Another church is about to be added to the number of those which have during the past few years sprung up in the district of Beech-hill, and the chief stone has just been laid. The erection of the edifice will cost about 2,000*l.*, which sum will be jointly borne by Mrs. Forbes and her daughter, and the Rev. E. H. Landon, her son-in-law, Mrs. Forbes also presenting the sum of 4,000*l.* for the purposes of the endowment. The church is to consist of a nave, north aisle and chancel, with vestry and organ-room on north side, the *matériel* used being brick and flint, partly dressed with stone. There will be a bell-turret covered with shingles. The roof will be an open one; and the open benches will accommodate a congregation of about 180. The church, which is dedicated to St. Mary the Virgin, is to be erected from a design by Mr. W. Butterfield, of London, architect; and Messrs. Wheeler, Brothers, of Reading, have undertaken the contract.

*Duston* (*Northants*).—The parish church has been re-opened after a restoration. The whole of the edifice, including the chancel, has been new roofed. The walls, pillars, &c., have been cleaned from whitewash, a quarter of an inch thick. All the old chopped stonework has been left naked, but the rubblework has been re-plastered. In cleaning off the whitewash two wall paintings were discovered on the tower, one of them historical, the other a crucifix of a Byzantine character. All the windows are new. The old high-fronted and high-backed pews have been taken down, reduced, and re-placed. The reading-desk and pulpit are new, and, in accordance with the character of the church, are quite plain. The church is warmed by a series of fire-pots in the ground, with horizontal flues communicating with an upright flue in the tower. The fire-pots are lighted from the bottom. The chancel has been re-roofed and restored at the expense of Lady Palmerston, the patroness of the living, who also contributed 150*l.* towards the general restoration.

*Wigan.*—A new church has been consecrated at Poolstock. The edifice has been erected solely at the cost of Mr. Nathaniel Eckersley, M.P., for the lately constituted parish of St. James. The church has been designed by Mr. Paley, who has taken for his types several churches erected in England during the fourteenth and fifteenth centuries, the prominent features of which are traceried windows, ornamental parapets, and a tower, in place of the high-pitched roof and tapering spire. The church is built of Parbold stone. The height of the roof of the nave is 47 ft., and the height of the tower, which is 16 ft. square, is 110 ft.: the chancel is 40 ft. long, and the dimensions of the nave are 78 ft. by 53 ft. There are three stained-glass windows in the chancel, one in the tower, and one in the Eckersley chapel, to the south of the chancel, which is the only part of the church not unappropriated. There are sittings for 700 persons, and the cost of the building is estimated at 14,000*l.* or 15,000*l.*

## DISSENTING CHURCH-BUILDING NEWS.

*Swan Village.*—A Wesleyan new chapel has been opened here for divine service. The building, which is partly of brick and partly of stone, is capable of accommodating between 400 and 500 persons. It has been built under the direction of Mr. John Lees, of West Bromwich, the architects being Messrs. Loxton, Brothers, of Wednesbury. The total cost is upwards of 2,000*l.*, towards which sum Mr. Thomas Davies, of the Hollies, West Bromwich, and Mr. John Lees, each gave 100*l.* to start with, and afterwards, on the occasion of the laying of the memorial stone, about twelve months ago, added 50*l.* each to their former donations.

*Stoke-sub-Hamden.*—The new Congregational Chapel recently erected in the village of Stoke-sub-Hamden, has been opened. The chapel is said to be "in imitation of the Decorative style of architecture, which has not, however, been strictly preserved." The body of the chapel is fitted with open seats of stained deal of the ancient type. The chapel is 35 ft. in height, and the roof, which is partly open and partly ceiled, is supported by carved corbels of Ham-hill stone. It is lighted on each side by five single-light windows, and there are five dormer lights on each side of the roof. At the west-end is a seven-light window with flowing tracery, underneath which room has been left for the erection of a gallery, if necessary. At the extreme east end is a circular apse, in the front of which is the pulpit, enclosed within rails. This is raised about 2 ft. above the body of the chapel. Behind the pulpit and within the apse is sufficient space for an organ. The building will accommodate about 350 persons. Behind the apse a vestry-room has been erected. Underneath is a schoolroom, which extends the entire length of the building. There are class-rooms, which are divided by partitions. The chapel spire is upwards of 90 ft. in height, and is furnished with a bell-turret. The walls are entirely of Ham-hill stone, the interior being stuccoed with Ham stone facings. The building stands within iron railings supported by Ham stone pillars.

*York.*—The trustees of the York Centenary Wesleyan Chapel, St. Saviourgate, in this city, have had some improvements effected in the seating of the area of the chapel, and the edifice cleaned, painted, and beautified. The contract for the latter portion of the work was let to Mr. Thomas, painter and decorator, and he has just completed the painting and ornamentation of the building. Mr. E. Taylor, architect, superintended the work. Exclusive of the semi-circular termination at the west end, the ceiling is 100 ft. square, and is divided into thirty-five panels, 9 ft. square each. Half of these panels are plain, but the other half are ornamented in the centre with large rose-flowers. The facia around the panels is 5 ft. in breadth, and is painted a very pale green colour. The beams inclosing the panels are of a cream colour, and a golosh stencil decoration in gold colour is also introduced. The perpendicular sides of the beams which face the panels are embellished with Grecian fretwork in maroon. The ceiling is painted a tint of peach blossom, with a bead and real stencil ornament in cinnamon colour. The surface of the inner panels is painted pale green, and the sides are light pink colour, with Grecian scroll ornaments in green. The central rose flowers are painted in pale tint Naples yellow, and are relieved with white, green, red, and cream colours. The egg-shaped cornice around the gallery front is decorated in tints to harmonize with the ceiling, bead and reel, Grecian and stencil ornaments being employed for decorative purposes. The woodwork of the front part of the gallery and the pewing throughout the building are painted light oak colour, and the walls of the entrances of the ground-floor, and of the galleries and the staircases, are also painted in the same style to a height from the floors of 4 ft. 6 in. and there is a capping in imitation of mahogany to correspond with the cappings of the pews. The pillars supporting the gallery are painted in a style to resemble brass, and the capitals are of a soft green colour in the recesses, whilst the raised ornamental work is etched with gold. The walls of the chapel are painted in Pompeii and buff, and the stringcourse around the building is of a straw colour, with stencil ornaments at the intersections. The frieze is also of the same colour, backed up with soft red, and relieved upon each side of the moulding in pale cream colour. The blocks that support the cornice, which are in pairs and fixed at about 5 ft. apart, are in colour a pale cream, and the egg-and-tongue moulding is painted white, the background being vermillion. Next is a stencil upon a pale cream-coloured ground, relieved upon each side with a moulding of pale straw colour, and then comes the facia, 5 ft. in width. Upon the ceiling alone there are 4,500 ft. of stencil ornament. The altar-rails and the balusters of the staircases leading into the pulpits are painted emerald green, and etched with gold. Mr. Thomas has also received instructions to illuminate the outer pipes of the organ. They will be stencilled in diaper work to correspond with the decorations of the chapel. The school-rooms, vestries, and other apartments connected with the chapel are about to be painted, and a little ornamentation will be introduced where required. The cost incurred in decorating and painting the chapel has been about 400*l.*

*Newcastle-upon-Tyne.*—Marlborough-crescent Baptist Chapel has been re-opened. The chapel has been almost entirely rebuilt under the direction of Mr. J. E. Watson, of this town, architect, at a cost of 1,200*l.* The chapel being situated

between houses, the architect was not able to introduce side windows; but this want has been compensated by heightening the walls and introducing clerestory windows. The sittings are movable forms, so that the ground-floor may be arranged to suit any particular occasion. A gallery runs around the building, excepting at the end, reserved for the platform. The front panels of the gallery, and also of the platform, are filled in with ornamental ironwork. The roof is entirely open, the wood being stained, and is supported on light ornamental cast-iron columns, with floriated capitals; and the centre portion of the roof is raised above the side roofs in the form of a clerestory, and lighted with clerestory windows, which open for ventilation. The work has been done by Mr. Joseph Kyle, contractor. Behind the chapel is a large school-room, attended by about 200 scholars.

## STAINED GLASS.

*Sutton Benger Church.*—A stained window memorial has been placed in this church. The subject is the Good Samaritan, executed by Messrs. Gibbs, of London. Since the restoration of the church, there have been several stained windows added.

*Uxbridge Church.*—A stained glass window has been recently placed over the altar in this church, in memory of the late Captain Price, son of the incumbent. This window is by Messrs. Hardman, of Birmingham. The figures represented are those of our Saviour, in the centre, St. Peter on the right, and St. Paul on the left; above, on a smaller scale, the angel delivering St. Peter from prison, and the conversion of St. Paul on his way to Damascus; the apex of the window displaying the emblem of the Holy Spirit.

*Ilkley Church.*—A memorial window to the late Dr. Smith, of Wells House, has been erected in this church. The window is situated on the east end of the south aisle, and consists of three bays, or compartments, separated by the stone piers. The centre one, which is the highest, is occupied by a full-length figure of St. Luke the Evangelist, being the principal feature in the window. The figure is surmounted by a canopy composed of architectural work and foliage ornament. On either side of the principal subject are the Good Samaritan and our Lord healing the sick of the palsy. The window was supplied by Mr. William Wailes, of Newcastle.

*Clocaenoy Church, near Ruthin, North Wales.*—A stained-glass east window has been placed in this church, designed and executed by Mr. Holland, Warwick, and containing the Crucifixion in the centre, and figures of St. John and St. Mary in side openings under rich canopies, with angels bearing scrolls, &c.

*Locking Church, near Weston-super-Mare.*—A painted window has just been placed in the south aisle of this church, to the memory of the Lady Henrietta Carlotta Law, who died the 25th of February, 1866. It is a three-light Perpendicular window, and the scene represented is the Resurrection of our Lord, the artist being Mr. Bell, of Bristol. In the centre light is our Lord in the act of leaving the tomb; on the right are the Apostles SS. Peter and John, and on the left the two Marys. At the base are the Roman soldiers. The upper portion of the window is filled in with canopy work, there being two angels on the outside holding scrolls. Immediately underneath the tomb is the text, "In the world ye shall have tribulation, but be of good cheer, I overcome the world." The tracery is occupied with heraldic devices connected with the family of the deceased.

*Abbey Church, Selby.*—This edifice has just received the addition of two stained-glass windows. The large Perpendicular window over the western doorway is the gift of Captain Parker. In the centre opening is the subject of the Crucifixion; on the left, the Holy Women; on the right, St. John, Joseph of Arimathea, and the Centurion, the figures being nearly life-size. Beneath are subjects on a similar scale (commencing on the left hand), the Agony, the Garden, Christ bearing the Cross, and His Burial. The windows being unusually long, architectural canopies of the period are introduced. In the tracery are figures of the Four Evangelists, with St. Peter, St. Paul, and the arms of the Parker family. The other window, which is placed in the north side of the nave, is the gift of Mrs. Whitehead. It is one of the Norman period, our Lord taken down from the Cross being the subject represented. The design is enclosed in a rich border; the drawing, execution, and all details are of an early character. The windows have been executed by Messrs. Heaton, Butler, & Bayne, of London.

*Brancepeth Church* (*Durham*).—In the beginning of last year the tenantry on the Brancepeth estate entered into a subscription to present Lord and Lady Boyne with a testimonial window for the east end of this church, in acknowledgment of their liberality in restoring the church. At the request of the committee, Lady Boyne selected the design for the window, which has been executed by Mr. Blackmore, of London. The principal figures represent Christ as the Good Shepherd, and the four Evangelists—St. Matthew, St. Mark, St. Luke, and St. John. The Holy Ghost, in the form of a dove, is seen descending on our Saviour, and above are the representations of the Annunciation and the Nativity. Under the chief figures are subordinate figures, representing the four Evangelists following their particular callings.

*Ecclesfield Church.*—There has been placed in the east end of the south aisle of the chancel of this church a window to the memory of the late Mr. William Smith and his wife, by his son, Mr. Smith, of Barnes Hall, and other members of the family. The window consists of four lights, and the Birth, Crucifixion, Resurrection, and Ascension, the principal events of our Lord's life upon earth, are the subjects represented. We understand that the first sketch for the designs was supplied by Miss Gatty. The work has been executed by Messrs. Hardman, of Birmingham, and Powell's glass has been employed throughout.

## SCHOOL-BUILDING NEWS.

*Taunton.*—The foundation stone of Central National Schools has been laid in Magdalene-street. The new building is intended to form part of the Central National Schools for the parish of St. Mary Magdalene. It occupies the site of an ancient workhouse and police-station, and is contiguous to the existing school-rooms, which are to be altered. The ground-floor of the new building will be set apart for the infant school, and the floor above for the female classes; while the whole building, which is in a dilapidated state, will be re-roofed and fitted up for the boys. The boys' school will have a front ornamented with a 15-light Gothic leaded window, and also a new roof, with a turret. The infant and girls' schools will be lighted, the former by two three-light square leaded windows in front, and the latter by two Gothic three-light transome windows. Beyond this will be the class-rooms, projecting 2 ft., and forming a gable end, lighted by two four-light square leaded windows above one another. The boys will also have two class-rooms. The entrance will be between the boys' and girls' schools, which are detached, by a porch leading into a passage, and connected with both. The front walls will be of Westleigh stone, with Ham and Bath stone dressings, and the roof will be of Bridgwater stone. The estimated cost, including the alterations on the old building and the play-ground, is nearly 2,000*l.*, part of which has been subscribed. Plans having been furnished by Mr. B. Ferrey, of London, architect, and approved, the work has been commenced by Mr. Davis, builder, Taunton, whose tender was accepted, and the walls are rising.

*Newmarket.*—The members of the Independent denomination of Newmarket have just opened their new school. By them the site of the old palace in the centre of the front street was purchased, and a chapel built thereon. The cost of this chapel was 2,800*l.* Since that period the society conceived a plan for the further benefit of the Dissenting families of the town, namely, the erection of a schoolroom at the extreme boundary of the chapel ground. The building extends in length the whole width of the ground, and will afford accommodation for about 200 children. There are two fireplaces on one side, and in the centre of the opposite side is a large niche, in which is a platform intended for the convenience of school inspection and as a rostrum for lecturers during the winter months. At the south end is a room set apart for Bible classes, and a kitchen for anniversary and school-treat accommodation, the whole serving as an adjunct to the chapel.

*Moston* (*Manchester*).—The foundation-stone for a new Sunday-school, belonging to the Methodist Free Church, has been laid at Chain Bar, Moston, by Mrs. Harrison, of Dudley House. The site of the new building is in the midst of an increasing population. The new building will be a plain brick structure, with one large room on the ground-floor, and two vestries behind. The cost will be about 300*l.*

*Eccles.*—The new schools belonging to the parish church of Eccles have been formally opened. The schools are centrally situated in the village, in Albert-street, a few hundred yards to the west of the old church. The buildings comprise an infants' room, 74 ft. by 30 ft., which is also adapted for parish meetings and other gatherings. It will hold 300 children arranged on the Government plan, but 400 or 500 may assemble in it. The work has been let in separate contracts to Messrs. Bradbury, Griffiths & Johnson, Pendlebury, Dovey, Wooler, Ward & Harwood, and George Kirkley, who work under the superintendence of the architect, Mr. J. Medland Taylor.

*Birmingham.*—Plans for the proposed parochial schools have been prepared by Messrs. Martin & Chamberlain, architects, and approved of by the local General Purposes Committee. The building will be three-storied, of brick, with stone dressings, and will accommodate 750 children, with dwellings for teachers, and the cost is estimated at 21,000*l.*

## PATENTS CONNECTED WITH BUILDING.

Safety Net to arrest the Fall of Persons or heavy Bodies under Circumstances of Danger.—*L. E. Laurency.* Dated November 18, 1865.—The object of this invention is the production of a safety net. In building, repairing, or decorating buildings, the safety net may be applied;—first, at the edges of roofs; secondly, to builders' or decorators' scaffolds, either inside or outside of buildings; thirdly, beneath the flying or movable scaffold or ladders of painters, plasterers, and others who work on the fronts of houses or façades of buildings, and are daily exposed to accidents, which unfortunately too often occur. The net is of more or less length, according to the size of the scaffold which it is to secure. The breadth, although variable, is usually about three yards, and is raised on the side towards the street. The body of the net is of rope, in squares of about 4 in., and of a thickness of about 2½ in. The centre is traversed crosswise by strong bands or straps, 6 in. broad, and fixed to the framing. The two sides of the length are of double plaited bands, and the extremities are composed of two sticks, covered with tow and leather, and to which are fixed the rings for the ropes which suspend the net along the walls, and fix it at the desired height. Buckles or rings and cramps or catches serve to unite several nets. The net is upheld by the main rope, which at the corner seizes a ring by the aid of a galvanized iron hook, and, passing round the stick, rises to the roof, and is there attached according to the facilities afforded by the building in the middle of the height. This rope carries a strong ring, from which starts an under rope which supports the net by the half, to guard against accident if the stick should break. It is held, like the other rope, by a hook. The same net, held up by shortened ropes, is placed at the edges of roofs having the greatest slopes, and forms at the bottom a wall of rope which preserves the slaters, plumbers, masons, carpenters, or other workmen from danger.

Manufacture of Bricks or Building Blocks. *L. G. Speyer.* Dated 17th November, 1865.—In making bricks or building blocks the patentee applies a compound consisting of slack lime reduced to powder, or of gravel or sand, two measures of ashes of charcoal or peat, two measures of heaped scoria, and one measure of Roman or Portland cement. The ashes and half of the scoria can be omitted by substituting for these substances an equal quantity of gravel, but in this case the cement should be increased by half a measure.

Constructing the Treads of Steps or Stairs.—*G. Hawksley.* Dated 21st, December, 1865.—The patentee employs a cast-iron frame, having numerous openings in or through it, of the form of the tread of each step or stair, which frame may be cast in one piece or may be cast in sections. Into each opening is introduced wood—by preference, with the grain upwards, though some hard woods will admit of being used with the grain at an inclination in a horizontal position.

Between the neighbouring pieces of wood there are channels or grooves left, which may be more or less filled up with bituminous or other cement, but it is desirable to leave channels or grooves to convey off any water deposited on the treads.

Making Building Bricks Impervious to Water.—*E. Taylor.* Dated 5th January, 1866. This invention consists in the application to bricks already burnt in a kiln, and bricks to be hereafter made in the usual manner, and also moulded of any irregular or ornamental shape, as circumstances may require for the ornamentation of the fronts of buildings and other purposes, of a glaze on their surface with a suitable glass or enamel to make them waterproof, and also to vary the colour of such parts of the bricks as are intended to be exposed if required to give them other than their natural colour for the external surface of walls, either for the outside or inside of buildings, and this will in a measure depend upon the clay the bricks are made of, but will be more often required for the inside walls, such glazing with one or more suitable colours being burnt on during the process of burning or passing such bricks through the necessary kiln. The said bricks, before glazing, can be marked with a pattern like paper-hanging.

Moulding Articles of Clay, Earthenware, or Porcelain.—*R. Jobson.* Dated 3rd February, 1866.—The patentee places in each of the joints of the mould (which he usually makes of metal) a strip of a soft or compressible material, such as leather, wood, or felt, for example, and thus the joint is made tight. The use of soft or compressible strips in the joint, as above described, offers great facility for moulding articles in plastic clay, as it allows the use of compound plungers, such as are described in the specification of a former patent granted to the present patentee, dated the 22nd of November, 1860 (No. 2862). He also, according to this invention, forms small grooves in the plungers by which the pressure is applied, so that any surplus clay which may be put into the mould may pass out through the grooves and escape from the mould, and by turning the plunger the strips so formed are at once detached from the moulded article.

Apparatus for Heating Conservatories, Apartments, or Boilers, by Means of Gas.—*T. A. G. Willington.* Dated 3rd February, 1866. The patentee employs two or more heating chambers or stoves, which are internally heated by gas jets. The heating stoves or chambers are connected together by a heating pipe or tube conducted round the place which is required to be heated. One of the chambers he makes larger than the other, and heats it with a greater number of gas jets, and this, to distinguish it, may be termed the inlet heating chamber; and he connects it by means of an inlet pipe with the open air. To the inlet heating chamber is attached one end of the heating pipe or tube, and when the apparatus is used for heating conservatories or other places of moderate size he fixes at or near the other end of the heating end of the heating pipe a second and smaller heating chamber or stove, in which a smaller number of gas jets are burned, and which may be called the outlet heating chamber, as it is connected with the open air by an outlet pipe. The action of the heating apparatus is as follows:—The combustion of the gas in the smaller or outlet chambers causes it to act as an exhaust, and draw a current of heated air through the connecting pipe or tube from the larger heating chamber. The latter, in which a larger number of gas jets is burned, is constantly delivering volumes of heated air, which heated air is urged and passed through the tube and drawn into the outlet heating chambers, and then passed on into the open air.

## Books Received.

*The Present State of the Drainage Question.* By William Menzies, Deputy Surveyor of Windsor Forest and Parks. London: Longmans, Green, & Co. 1866.

Mr. Menzies is on the side of those who say, "the sewage for the soil, the rainfall for the river," to which view we have always strongly inclined, though, admitting the difficulties, we have yielded to circumstances. The writer treats the subject under the three aspects of,—

1. The Sanitary;
2. The Engineering and the Economical; and
3. The Agricultural;

and gives some strong statements in support of the view he adopts. The pamphlet is eminently worthy of calm consideration.

*Useful Rules and Tables relating to Mensuration, Engineering, Structures, and Machines.* By W. J. Macquorn Rankine, Regius Professor of Civil Engineering in the University of Glasgow. London: Charles Griffin & Co. 1866.

The title is quite correct: this is a volume of very useful rules and tables relating to engineering and construction. It is divided into nine parts: of these Part 3 relates to engineering geodesy, comprehending surveying, levelling, and the setting out of works; Part 5 relates to the balance and stability of structures; and Part 6 to the strength of materials; commencing with a series of tables of the resistance of various kinds of materials to straining actions of different sorts. The reputation and position of Professor Rankine give sufficient assurance of their correctness, and of the excellence of the selection.

## VARIORUM.

"Christian Society" is "a monthly magazine of religious information and biography," published by Groombridge & Son. No. 1, now before us, includes a paper on "The True Site of the Holy Sepulchre." The object of the writer is to support the old belief in opposition to Mr. Fergusson's theory. In showing that the remembrance of the site was kept alive in the early times, he makes a quotation not heretofore referred to, as he thinks. He says, "Lucian, a presbyter of Antioch," who suffered A.D. 312, forcibly appeals to "the testimony of the spot itself," as a proof of the facts recorded in the gospels; "to the rock of Golgotha rent asunder by the burden of the Cross; and the cave which gave up the body restored to life, after that the gates of hell were torn away."*

## Miscellanea.

Congregational Memorial Hall.—It is proposed to erect a Memorial Hall in London in connexion with the Congregational body. A freehold site has been secured between Bow-lane and the new street leading from Cannon-street to the Mansion House. The cost of the site and building is estimated at between 70,000*l.* and 75,000*l.*, and of this sum about 50,000*l.* have already been promised.

Intended Exhibition at Leeds. — The new infirmary in Leeds, the architect of which is Mr. Scott, and which is to cost 80,000*l.* or 90,000*l.*, will be completed next year. In order to add to the endowment fund, it was proposed to open it with an Art and Industrial Exhibition. On Thursday in last week, a meeting was held in the Town-hall on the subject, when the directors of the Mechanics' Institute (who are also building a new hall) and a strong deputation attended, claiming to have first conceived the idea of such a means of providing funds. It was decided that an exhibition should be held in 1868 in the new infirmary, and, as a solatium, it was resolved to offer the directors of the Mechanics' Institute 2,000*l.* out of the proceeds.

Open Spaces round the Metropolis.—There are yet remaining some 13,000 acres of unenclosed land within fifteen miles of London, the whole of which runs more or less danger of being enclosed, built over, or otherwise rendered inaccessible to the public. We trust that the commoners, in whom alone is vested the legal right to resist encroachments, will, for the advantage of the community as well as themselves, bestir themselves before it be too late. The matter, however, should not rest so; it is now ripe for legislative interference. It is no longer the commoners who are interested in resisting unlawful "approvements" by the lords of their manors, but the maintenance of these commons free and unenclosed is of vital importance to the public, especially the inhabitants of London; and the task of defending them from encroachment should not be left, much less restricted, to those comparatively few individuals who have at present the legal right to interfere.—*Solicitor's Journal.*

* Routh, "Reliquiæ Sacræ," iv. 7.

Proposed Water-works for Sudbury.—At a meeting of the local Paving Commissioners, the Committee appointed to consider the subject of a better supply of good water to the town reported that it is quite evident that a supply of good water is greatly needed, and that the whole expense would probably not exceed 2,500*l.* or 2,600*l.* With good management they believed this amount might in the course of 21 years be wholly paid off, without permanently increasing the present expenses of the town. The feeling of the meeting not being unanimous, the further consideration of the report was adjourned.

Midland Railway to Manchester.—Captain Rich, the Government Inspector, has certified as to the works on the Midland Railway, between Blackwell Mills Junction with the Buxton Railway and the New Mills Junction. Mr. W. H. Barlow is engineer in chief; Messrs. Campbell, Campion, & Langley, resident engineers; Messrs. Eckersley, Bayliss, & Ashwell, are the contractors. On a length of about 12 miles, there are seven tunnels, one being 1¾ mile long; four viaducts, one built of stone upwards of 150 ft. high from the foundations; and in addition, the difficulties of the route necessitated making the longest and most extensive rock cutting in England.

New Cottages at Windsor.—A block of Allen's improved cottages has just been completed adjoining those erected by the Prince Consort. They are the property of the Windsor Royal Society, the eight cottages having been built by the chairman, Major-General Seymour, and the committee, at a cost of 760*l.*, rather less than 100*l.* each. The materials used in their construction consist principally of white brick and Allen's patent stone, the latter being also used for the staircases, instead of wood. There are four dwellings on the ground, and four on the first or upper floor, each habitation being a sort of flat. The dwellings on the ground floor contain a living-room, a bed-room, and kitchen; while those on the upper have each an extra bed-room. All the cottages are let; the dwellings on the upper floor paying 4*s.* 6*d.*, and those on the lower 3*s.* 6*d.* per week for rent.

Measuring Rules.—The box-wood of which rules are made is chiefly grown in Turkey, the English-grown box-wood not being of sufficient size and quality. Formerly, large numbers of rules were exported to the United States of America, but during the past thirty years they have been manufactured in the States, a prohibitive tariff having prevented the introduction of English-made goods. The way in which some nations—or rather, some Governments—regard the importation of rules into their territories, is rather strange. Some allow, at fair and equitable rates of duty, the importation of English-made rules, the measures being suitable to the use of their respective countries. But while one country will not admit them at all unless the measure of the country is surrounded by other measures, so as to make the rule a scale of varied measures instead of being only the legal standard of the country, another Government looks upon all rules coming to its ports as illegal measures because they have not the Government stamp upon them, and all so found are seized. The makers do not put a resemblance of the official stamp upon them; and, as there are no native rule-makers, and all the rules are imported, measures a little different from the legal standard are made, and being marked with the name of another country than that for which their use is intended, are allowed to be admitted: thus the greater part of the people are necessarily using an incorrect measure, at the same time that the true standard might be supplied to them as cheaply and more readily. The various countries and states of the world have at the present time about 150 different measures. Many small places, each containing only a few thousand inhabitants, have their own peculiar measures. At various times many of these measures have been changed from the duodecimal to the decimal division, still retaining the original standard of length; but within the past few years the use of the French metrical measure has become much more common in all parts of the world. Many nations now have a large proportion of their rules marked with the French mètre in addition to their own standard, and are thus, doubtless, gradually tending to the general adoption of so convenient and perfect a measure of length as the French mètre is admitted to be.—*Birmingham and the Midland Hardware District.*

The Pneumatic Despatch Company. — The report of the directors of this company states that a series of carefully recorded experiments as to the cost and facility of working has been made, from which it appears that 120 tons of goods can be passed through the tube per hour at a speed of 18 miles, the cost being under 1d. per ton per mile.

Electric Shot.—An Austrian chemist, M. Leinelbroek, has discovered a way of inclosing electricity in small glass capsules, which will explode under the influence of the slightest shock. The capsule is inclosed in a steel cone, so that, if shot from a rifle, it will enter the flesh, and the explosion which follows is sufficient to kill a man. Experiments, says *Galignani*, have been made on oxen and horses with perfect success, these animals having fallen down as if struck with lightning.

Fall of a Chimney in Manchester.—At the Broughton Grove Paper Works, Bury New-road, Manchester, a huge chimney, nearly 200 ft. high, in the course of being built, was blown down in the late gale. Misgivings were entertained even from the beginning of its erection that the foundation was not secure. For several days before its fall it gradually declined from the perpendicular, and the workmen discontinued their labours. The high winds accelerated its fall, and it came to the ground with a fearful crash. "The altitude of the chimney was 200 ft., and only a horizontal distance of the same length was reached. When it fell it would appear that a body composed of omnifarious parts acquired no centrifugal force in falling with a radius of 200 ft."

City Offices, Lombard-street. — The chief stone of the new premises of the City Offices Company has been laid in Lombard-street, by Mr. James Levick, Governor of the Crédit Foncier and Mobilier of England. Mr. Levick took up his position near the corner stone, and said that the site upon which they were about to build was one of the finest in all Europe, and occupied a superficial area of 15,000 square feet. The cellarage would occupy nearly one-third of an acre, and to talk of one-third of an acre seemed almost marvellous in the City. There would be in addition a very extensive basement. The ground-floor would be constructed as one large open space, which could be divided in any way, to suit the requirements of whoever might be their tenants. There would be four stories above the ground-floor. Upon a low estimate, it was calculated that they would realize a rental of from 20,000*l.* to 25,000*l.* a year. Messrs. F. & H. Francis are the architects; and Messrs. G. Myers & Son, the builders.

Metropolitan District Railway.—The report of Mr. J. Fowler and Mr. T. M. Johnson, the engineers, to the directors, states, that the contractors are now in possession of all the property required for the works, from the junctions with the West London Railway and from the Kensington joint station to Prince Albert's-road, Kensington; from Sloane-square to Ebury-street; and from Belgrave-street South to Buckingham-row, Westminster—constituting a total length of nearly three miles. The works are in active progress upon the whole of this acquired property, including the stations at Richmond-road, Kensington High-street, Gloucester-road, Sloane-square, and Victoria. A portion of the property required for the St. James's-park station at Westminster has also been delivered to the contractors, and the station works commenced. The railway works are in a forward state across Parliament-square Gardens, and every possible exertion is being made to obtain possession of New Palace-yard and the streets adjoining, so that the work there may be completed before the next sitting of Parliament. The designs for the railway work opposite Westminster Abbey have been agreed upon with the Dean and Chapter of Westminster, and arrangements have been made for the immediate commencement of the work. The designs for the communication between the proposed station at Westminster Bridge and the Houses of Parliament, and all the work connected therewith, have been approved by her Majesty's Chief Commissioner of Public Works. The details of the Thames Embankment works have been for some time under discussion with the Metropolitan Board of Works, and, excepting a few points, agreed upon. The works opposite the South-Eastern Railway Company's Cannon-street station, about 225 ft. of railway, have been completed.

The Croydon new Bath Building.—It having been discovered that the walls of this building were out of the perpendicular, some remarks were made in the Local Board of Health, which Mr. Franklin, the architect, thought reflected on himself. He, therefore, addressed the Board *viva voce* on the subject, and read various letters exonerating himself from blame in the matter. Several members of the Board expressed their opinion that no blame was attached to Mr. Franklin in the matter, and no resolution as to it was passed.

Ely Cathedral.—Several works are now in progress at this cathedral. The reredos is undergoing a decoration by Mr. Hudson. On the former occasions Mr. Hudson's labours were confined to the embellishment of the foliated portions, while now he is engaged upon the statuary. A series of carvings in the canopies of the choir-stalls are approaching completion. On the north side a number of New Testament illustrations, commencing with the birth of our Lord and ending with His ascension, are complete, with one exception. These wood pictures are the work of M. Abellard, of Louvaine. The renovation of the galilee entrance to the nave is progressing.

Explosion at Woolwich Arsenal.—It appears that a few months since a magazine of immense strength was built near the canal, and bordering on the Plumstead Marshes, for the sole purpose of storing gun-cotton. The walls of this building were of very thick brickwork, having a vaulted roof, and it was considerably detached from any other structure. This gun-cotton magazine has been blown up, completely destroyed, and the *débris* scattered in all directions. The magazine was seldom open; and, in consequence of the nature of the material, the utmost care was exercised. An inquiry has been instituted as to the occurrence; and its cause is supposed to have been incipient decomposition with heating or increased temperature.

Middle-class Education for the Metropolis. The first school in connexion with the new and comprehensive scheme of middle-class education for the metropolis, towards which the merchants and bankers of the City of London have subscribed sums amounting in the aggregate to 55,000*l.*, has been opened. The scheme was propounded about a year ago by the Rev. W. Rogers, rector of Bishopsgate, who had long seen that there was a large middle-class, composed of clerks, tradesmen, and others, for whom there was no public education provided, they being unwilling to send their children to the ward or national schools, and were debarred by various circumstances from availing themselves of the advantages of the great foundations, such as Charterhouse, Merchant Taylors, &c. A site for a central school has not yet been obtained; but the French Protestant Hospital, in Bath-street, St. Luke's, being vacant, in consequence of the removal of the inmates to the new building at Hackney, it was selected by a committee for one of the outlying schools, and it has been adapted for the purpose at a cost of about 2,000*l.* The school will accommodate 500 boys.

The Proposed New Route from Islington to the City.—On Thursday in last week a meeting of the inhabitants of Islington, Shoreditch, and St. Luke's was held for the purpose of considering the desirability of having a direct communication (already described in the *Builder*) between Islington and the City, through Packington-street, Shepherdess-walk, Bunhill-row, Moor-lane, and Fore-street, by which, in the present two-mile route, a saving of nearly half a mile would be effected. Mr. Alderman Lusk, M.P., presided, and the meeting was well attended. The following, among other resolutions, were unanimously carried:—

"That this meeting, having heard the report read and explanations given by the deputation from the committee appointed for promoting the direct route, resolves that a deputation to the Metropolitan Board of Works be appointed for the purpose of waiting upon and respectfully urging on the attention of that Board the importance of the proposed direct route being proceeded with at once, not only on account of the rapidly-increasing wants of the public, but also because much of the property on the line being sold and some of the leases within a few months of falling in, prompt and energetic action at the present time is therefore of the greatest advantage on the score of economy; and further, that the committee be kindly requested to bring the above resolutions before their several vestries, with a view to co-operation by similar resolutions."

"That Messrs. Horton, Roberts, Pool, Hanson, Nobbs, and Hutchinson, with power to add to their number, be requested on the part of this meeting to make the necessary arrangements with the committee of the route for forming the deputation."

The Seaton Statue for Devonport. — The colossal statue in bronze of the late Field-Marshal Lord Seaton, by Mr. George G. Adams, with its granite pedestal, has arrived at Plymouth. The work is at once to be placed in the garrison of Devonport.

Paving in St. Pancras.—The Vestry of St. Pancras have approved and printed a report of their surveyor, Mr. W. B. Scott, as to the paving of St. Pancras-road, King's-road, and Hampstead-road; High-street Camden Town, Park-street, and Kentish-Town road. The estimated cost of the paving of these roadways was 51,150*l.*, and the actual cost 49,661*l.* Including footways and intersections of adjacent streets, &c., the total cost was 56,637*l.*

A Paving-stone Cutting-machine. — A machine, worked by steam, is now employed at a stone quarry near Marcoussis (Seine-et-Oise), for cutting paving-stones. The apparatus consists of a sort of bridge extending over the bed of stone, and provided with rails, carrying the machine, which sets a heavy steel rammer in motion, by which the material is broken into pieces of the requisite dimensions, the strokes being dealt in three directions.

## TENDERS

For rebuilding warehouse, Queen's Head-passage, Newgate-street. Messrs. John Young & Son, architects:—

| | |
|---|---|
| Brass | £1,695 0 0 |
| Hart | 1,690 0 0 |
| Henshaw | 1,669 0 0 |
| Webb | 1,647 0 0 |
| Chessum | 1,565 0 0 |

For City Offices Company's New Building, Lombard-street. Messrs. Francis, architects:—

| | |
|---|---|
| Myers & Sons (accepted) | £57,567 7 6 |

For new chancel, chancel aisle, and vestry, for St. Luke's Church, Paddington. Messrs. Francis, architects:—

| | |
|---|---|
| Dove, Brothers | £1,949 0 0 |
| Myers & Sons | 1,934 0 0 |
| Fish | 1,839 0 0 |
| Hill & Sons | 1,766 0 0 |
| Simpson | 1,727 0 0 |
| King & Sons | 1,684 0 0 |

For alterations to "Mercury" office, 98, Northgate-street, Gloucester, for Mr. C. Jeynes. Mr. H. James, architect:—

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|---|---|
| Clarke (accepted) | £148 10 0 |

For warehouse, Birmingham House, Westgate-street, Gloucester, for Mr. H. Bryan. Mr. H. James, architect:—

| | |
|---|---|
| Meredith (accepted) | £400 0 0 |

For two houses, Bristol-road, Gloucester, for Mr. H. Fisher. Mr. H. James, architect:—

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|---|---|
| Smith (accepted) | £510 0 0 |

For rebuilding and repairing the boundary walls of churchyard, &c., for the churchwardens of Christ Church, Spitalfields. Mr. Tolley, architect. Quantities not supplied:—

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|---|---|
| Trayt, Brothers | £510 0 0 |
| Myers & Son | 330 0 0 |
| Langmead | 290 0 0 |
| Tolley (accepted) | 276 6 8 |

For certain works and alterations at the workhouse, for the guardians of the Whitechapel Union. Quantities not supplied. Mr. Tolley, architect:—

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|---|---|
| Rivett | £243 0 0 |
| Golding & Son | 240 0 0 |
| Trayt, Brothers | 240 0 0 |
| Harding | 232 0 0 |
| Reed & Rathwell | 220 0 0 |
| Wilkinson & Co. | 199 0 0 |
| Johnson | 198 0 0 |
| Langmead | 195 0 0 |
| Palmer & Son | 195 0 0 |
| Crabb & Vaughan | 194 0 0 |
| Johnston (accepted) | 187 0 0 |

For offices, &c., Lord-street, Liverpool, for Mr. Wm. Earp. Mr. H. H. Vale, architect. Quantities by Mr. J. N. Crofts:—

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|---|---|
| Dobson | £11,696 7 0 |
| Denton | 11,550 0 0 |
| Horsman | 11,530 0 0 |
| Haigh & Co. | 11,100 0 0 |
| Witter | 10,690 0 0 |
| Roberts & Robinson | 10,600 0 0 |
| Hughes | 10,590 0 0 |
| Rome | 10,550 0 0 |
| Martin | 10,198 0 0 |

For pair of villa residences, Breeze-hill, Walton, Liverpool, for Dr. James Johnson. Mr. H. H. Vale, architect. Quantities by Mr. J. N. Crofts:—

| | |
|---|---|
| Mullin | £2,784 0 0 |
| Burroughs | 2,734 0 0 |
| Tomkinson | 2,695 0 0 |
| Hughes | 2,650 0 0 |
| Hardy | 2,634 0 0 |
| Edwards | 2,600 0 0 |
| Litt & Wilkinson (accepted) | 2,508 0 0 |

For house, offices, and stables, Littleport Vicarage, near Ely. Mr. William Smith Drummond, architect:—

| | |
|---|---|
| Freeman | £3,700 0 0 |
| Bell & Sons | 3,578 0 0 |
| Brown | 3,409 0 0 |
| Law | 3,387 0 0 |